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STUDIES IN THE FOOD REQUIREMENT OF ADOLESCENT GIRLS: I. THE ENERGY INTAKE OF WELL-NOURISHED GIRLS 10 TO 16 YEARS OF AGE

BERNICE WAIT AND LYDIA J. ROBERTS

Department of Home Economics, University of Chicago

THIS paper is the first of a series dealing with the food requirements of adolescent girls. It reports a study of the energy intake of 52 well-nourished girls 10 to 16 years of age. A survey of the literature has shown that the caloric standards in common use for these years are largely hypothetical (1) because they are based on too few studies at any age and (2) because much of the data used was obtained on underweight or even sick children. The present investigation was undertaken with the view to increasing the number of studies of well-nourished girls of these ages sufficiently to warrant more definite conclusions regarding the needs of girls in the period of rapid growth and immediately following it. This objective has been realized only in part, for even with the increased data the findings are still tentative in many respects.

LITERATURE

By far the largest contribution to the total energy requirements of children has been made by dietary studies in which the intake only was determined. In such studies it is assumed that the food consumption of a normal individual eating a freely chosen diet under his customary conditions, if determined for a sufficient length of time, probably represents his energy needs, provided weight is maintained, or in children if normal growth occurs during the period of observation. That is, for the data to be usable for standards, studies should be made by accurate methods under conditions normal for the child and with the intake uncontrolled at least in amount, so that the calories for the period may be representative

of the intake of which the child is a product. The subjects, also, should be healthy and well-nourished and gain normally (or at least maintain their weight) during the experimental period. A survey of the literature reveals only 72 individual observations on girls 10 or more years of age which fulfill or approximate these conditions. These studies are summarized in Table 1.

The earliest and one of the most satisfactory studies is Hasse's observations (1882) (10) on six healthy, well-nourished girls in two well-to-do Russian families. All food eaten by each child was weighed for six days and again later for a three-day period and the values of the diet calculated using König's (15) figures of average composition of foods. The values of the cooked foods were also computed from their ingredients save for the most-used foods, which were analyzed. Only one of Hasse's subjects—an 11-year-old girl—falls in the age group with which this review is concerned. The intake of this subject averaged 2391 calories for the two periods. In 1898 Herbst (12) reported a study by similar methods on six children for a 10-day period. Three of these were adolescent girls aged 10, 12, and 14 years. Their average intakes were 1883, 1899, and 1829 calories respectively.

In 1892 Prausnitz (18) reported the results of 10-day studies of 71 students 10 to 17 years of age in the school of Household Economy in Essen. Diets were not weighed for individuals but for groups of ten, the work being done by students as class problems, and the results are reported as averages only. On this basis the calculated average daily intake was 100.5 grams of protein, 74.6 grams of fat, and 415.2 grams of carbohydrate, or 2735 calories per day, for girls averaging 14.5 years of age.

The most extensive studies made by individual methods are those of Sundström (23) in 1908 and Carl Tigerstedt (24) in 1916 in a Finnish community. Individual dietary studies were made of entire families for periods of a week. The food was weighed in the home and aliquot portions taken to the laboratory for analysis. The two studies included 26 girls 10 to 17 years of age, as recorded in Table 1. A glance at this table shows that the intakes vary greatly and bear little relation to age. In a few cases the intakes are so low (1200 to 1500 calories) that one wonders whether accurate records of typical intakes were obtained, or if so, whether the children were adequately nourished. In a few cases the intakes reach the higher values of 3000 to 3600 calories. Since most of the group were reported as engaged in active physical work—housework or work in the fields—these higher figures are more in keeping with what might be expected for such a group.

As part of his study of metabolism during growth, F. Müller (1915) observed the intakes of 36 children, first in their own homes for one year and later for longer periods in a health resort (Eichkamp) (17). The food eaten by each child at home was weighed and aliquot samples equal to one-tenth of the child's intake were taken to the laboratory for analysis, but the diets at Eichkamp were calculated from analyses made of the foods used. The study included 7 girls 10 to 13 years of age (Table 1). The intakes of these girls ranged from 1725 to 2995 calories and were usually higher at Eichkamp than at home, the average intake at home being somewhat lower, but at Eichkamp comparable to the usually accepted values for these years.

The increased need for food during adolescence, due to the rapid growth and activity of children in this period of life, was emphasized by Holt and Fales in 1921 when they established their much-used energy standards (14). In deriving these standards the authors appear first to have calculated theoretical values, beginning with determined basal requirements and adding to these estimated amounts to allow for growth, activity, and losses in the excreta. These theoretical curves were checked by observations of over 100 selected children for 4-day periods in their own homes. The diets were weighed by the mothers and the calorie value calculated. Unfortunately, cooked foods and mixtures were also computed from average figures, thus introducing a significant source of error. It is important to note (1) that only eight girls of 10 years and over were included in this study, and (2) that the intakes of all eight are below the authors' theoretical curve, only two being above 2200 calories. These facts should be borne in mind whenever these standards are used.

The highest intakes for adolescent girls—save for a few individuals of Sundström and Tigerstedt—are those obtained by Bedale (4) in her extensive research in a private school in England. A total of 75 individual studies on adolescent girls were made for periods varying in length from one to six days. Reliance was placed upon more observations for shorter periods rather than on few for longer periods, in order to avoid the falling off of intake due to the boredom of the procedure if too long continued. The food value of the diets were obtained partly by analyses and partly by calculations from published analyses of foods. Unfortunately, the results are reported only as averages for different ages. These averages, as already noted, are generally high, ranging from 2756 to 3310 calories for girls of 10 to 17 years.

Two studies which add data on energy intakes of girls, though carried

TABLE 1

Total daily intakes by age of healthy adolescent girls reported in the literature

DATE, WORKER, AND COUNTRY	GIRL	AGE		NUMBER OF EXPERIMENT DAYS	CALORIES†	WHERE OBSERVED	DATE, WORKER, AND COUNTRY	GIRL	AGE		NUMBER OF EXPERIMENT DAYS	CALORIES†	WHERE OBSERVED
		Years	Months						Years	Months			
1882, Hasse, Russia	I	10	7	6	2,465	Own home	Tigerstedt	No. 126	16		7	2,500	Own home
	I	11	3	3	2,242	Own home		No. 163	16		7	3,119	Own home
								No. 26	17		7	2,688	Own home
1898, Herbst, Germany	IV	10	9	10	1,883	Own home		No. 96	17		7	1,398	Own home
	V	12	6	10	1,899	Own home							
	VI	14	6	10	1,829	Own home	1921, Bedale, England	1*	10			2,656*	School
1908, Sundström, Finland	No. 4	10		3	1,777	Own home		13	11			2,848	School
	No. 15	10		4	1,493	Own home		16	12			2,757	School
	No. 29	10		7	1,950	Own home		7	13			3,171	School
	No. 134	10		7	1,632	Own home		4	14			3,170	School
	No. 141	11		7	1,667	Own home		8	15			3,092	School
	No. 13	13		7	2,546	Own home		6	16			3,020	School
	No. 14	13		7	2,756	Own home		17	17			3,310	School
	No. 7	15		7	3,661	Own home	1921, Holt and Fales, United States		10		4	2,650	Own home
	No. 3	15		3	2,375	Own home			10		4	1,900	Own home
	No. 132	16		7	1,914	Own home			10		4	1,770	Own home
									12		4	2,200	Own home
1915, Müller, F., Germany	Xb	10	2	7	1,888	Own home			12		4	2,100	Own home
	Xb	10	3	31	2,161	Eichkamp			13		4	2,250	Own home
	IXb	10	9	6	2,019	Own home			14		4	2,150	Own home
	IXb	10	9	55	2,442	Eichkamp			15		4	2,950	Own home
	XVIa	11	1	7	1,725	Own home							

	XVIa	11	0	20	2,121	Eichkamp	1922, Sherman and Hawley, United States	V. M.	10	2	24	1,779	Laboratory
	VIa	11	6	7	2,033	Own home		L. M.	10	11	9	2,581	Laboratory
	VIa	11	6	81	2,995	Eichkamp		A. F.	11	5	9	2,324	Laboratory
	IXa	11		55	2,413	Eichkamp		E. C.	11	7	9	2,356	Laboratory
	IXa	12	2	6	2,080	Own home		E. C.	12	0	48	2,559	Laboratory
	XIIIa	12	3	25	2,332	Eichkamp		E. C.	12	9	27	2,429	Laboratory
	IIc	13	4	7	1,757	Own home		L. M.	12	9	30	2,378	Laboratory
	IIc	13	0	21	2,180	Eichkamp		L. G.	13	6	9	3,010	Laboratory
1916, Tigerstedt, Finland	No. 152	10		7	1,763	Own home	1928, Wang et al., United States	L. F.	10			1,929	Laboratory
	No. 80	11		7	1,293	Own home		S. A.	10			2,260	Laboratory
	No. 17	12		7	2,702	Own home		R. G.	10			2,016	Laboratory
	No. 158	12		7	1,875	Own home		R. G.	10			2,413	Laboratory
	No. 32	13		7	2,109	Own home		F. L.	10			2,441	Laboratory
	No. 127	13		7	2,550	Own home		F. L.	10			1,781	Laboratory
	No. 163	14		7	2,735	Own home		F. L.	11			2,016	Laboratory
	No. 121	14		7	2,167	Own home		R. W.	11			2,754	Laboratory
	No. 94	14		7	1,584	Own home		R. W.	11			1,775	Laboratory
	No. 16	14		7	2,976	Own home		B. L.	11			2,436	Laboratory
	No. 151	15		7	2,340	Own home		B. L.	11			1,784	Laboratory
	No. 21	16		7	2,367	Own home		B. L.	12			2,293	Laboratory

* These figures in Bedale's study refer to the number of studies at each age rather than the subjects, and the calories are for the mean at each age.

† The original date of Hasse, Herbst, Sundström, Müller, and Tigerstedt were calculated using Rubner's factors. All, excepting those of Müller, have been recalculated using the more commonly accepted factors, 4, 9, and 4, for the calorific value of one gram of protein, fat, and carbohydrate respectively.

out for a different purpose and under laboratory conditions, are those of Sherman and Hawley (22) and of Wang and her co-workers (25, 26). The former was a calcium balance study, and the diet therefore carefully controlled as regards calcium-containing foods. It was, however, unrestricted in calories as bread and butter were allowed ad libitum. This study included 8 observations on girls 10 to 13 years of age. The studies of Wang on the metabolism of undernourished children contained 12 observations on the intake of six "vigorous normal" girls 10 to 13 years of age. The results of both studies are included in Table 1. The intakes of Sherman and Hawley's girls fall around 2500 calories, save for one 10-year-old with 1779 and a 13-year old with 3010 calories. The values for Wang's six are close to 2000 or 2200 calories. It seems probable that the activity of both groups especially the latter was restricted by the experimental conditions, and the results are therefore probably low for normal standards.

Summarizing the foregoing studies we find that aside from the studies of Prausnitz and Bedale, in which group averages only are reported, there are 72 individual dietary studies on apparently healthy girls 10 to 17 years of age. The majority of these, however, are of the younger years: 37 are 10 and 11 years; 11 are 12 years; and 8 are 13 years of age. At the the later ages only 6 are 14, 4 are 15, 4 are 16, and 2 are 17 years of age. It is obvious that these numbers—at least above 13 years—are too few for the establishment of standards. Moreover, in some cases doubt may be raised as to either the normality of the children's activity or the accuracy of their reported intakes. Of further significance is the fact that the majority of these studies have been made on German, Finnish, and English children. Only three studies are on American children and these include but 19 subjects. These studies, moreover, are of doubtful value for use in standards, either because of the methods of computing the values of the diets (Holt and Fales), or because, being made for other purposes than caloric intake, they were conducted under laboratory conditions (Sherman and Hawley, and Wang et al.) and may not represent the children's accustomed intakes. Though all these studies therefore have suggestive value, they need to be supplemented by studies on American children carried out under more suitable conditions as outlined above.

THE PRESENT STUDY

Description of the girls and their environment

The 52 girls observed in this study were all normal, healthy, and some even superior children as judged by: (1) the medical records of the school

physician; (2) the relation of weight to the average for the height and age; and (3) a critical inspection by the observers. With three exceptions, all were of average weight or above in comparison with Baldwin-Wood standards. Although six were as much as 20 per cent above average they were not considered obese. The weights were obtained at the beginning and end of the study under standard conditions—in indoor clothing, without shoes, after emptying the bladder, and at the same time of day. Dietary records were discarded for any subjects who lost appreciably—as much as half a pound—unless their intake was well above the average. In most cases the girl's height and weight for a number of years were obtained from the school records and used to approximate the rapidity of her growth at the time of the study. The food intake for all subjects was observed for a week's time under their usual conditions of living and while eating their accustomed diets. Their food was "freely chosen" at least as to total quantity, for all were free to choose the amount and kind of food eaten within the limits of the menu served.

In the belief that the most normal conditions for growth and development of children is in a well-regulated home, it was originally planned to secure the subjects for this study under these conditions. Six girls were in fact thus observed. However, the difficulties and the labor involved in these studies by the methods first used were so great as to preclude the possibility of securing adequate numbers. For this reason it was decided to turn to high class institutions in which diet and living conditions approximate those of a good home. The remainder of the group, 46 children, were therefore secured in three such institutions. Four wereobserved in the Theodora Home, a well-regulated institution in Seattle,[1] and four others in Ridge Farm Preventorium near Chicago. The latter institution serves undernourished children, but these children when ready for discharge at the end of six months or a year are normal or even superior in health and nutrition. The four included in this study were of this normal group. By far the largest number, 38, were secured in Mooseheart, the orphanage of the Moose Lodge. This institution seemed unusually well suited for our purpose. It is the aim of the directors to provide the same type of care that children would have in a good home. The children are comfortably housed in small groups in cottages, with a matron in charge, and they have the same opportunity for schooling, outdoor play, and work at small household tasks as other children. Studies

[1] Data for the Seattle girls were collected by Lucile Streator in the Department of Home Economics at the University of Washington under the direction of one of the writers (B. W.)

TABLE 2

Description of girls

GIRL	AGE		HEIGHT		WEIGHT			GAIN OR LOSS	AVERAGE WEIGHT	DEVIATION FROM AVERAGE		PERIOD OF RAPID GROWTH	HAS MENSTRUATED	PHYSIOLOGICAL AGE	NUTRITIONAL CONDITION	WHERE OBSERVED	WHEN OBSERVED
					Beginning												
	Years	Months	Centimeters	Inches	Kilograms	Pounds	End			Pounds	Per cent						
							pounds	*pounds*	*pounds*								
C. M.	8	7	124.7	49.1	25.6	56.25	56.00	+0.25	56.0	+0.25	+0.4	Not yet	No	A	Good	Mooseheart	May, 1927
L. T.	8	9	124.0	48.8	26.9	59.25	59.50	+0.25	54.0	+5.25	+9.7	Not yet	No	A	Good	Mooseheart	May, 1927
B. M.	9	8	131.8	51.9	32.7	72.00	72.75	+0.75	64.0	+8.00	+12.5	Not yet	No	A	Excellent	Home: Chicago	Feb., 1927
K.	10	3	134.6	53.0	37.5	82.50	83.75	+1.25	68.0	+14.50	+21.2	Not yet	No	A	Good	Theodora Home	Nov., 1928
F. H.	10	3	132.8	52.3	27.5	60.50	60.13	−0.38	65.0	−4.50	−6.9	Not yet	No	A	Good	Mooseheart	May, 1927
E. R.	10	3	135.9	53.5	37.3	82.00	81.63	−0.38	69.0	+13.30	+18.8	Not yet	No	A	Excellent	Mooseheart	April, 1927
R. S.	10	3	131.0	51.6	28.9	63.50	64.50	+1.00	62.5	+1.00	+1.6	Not yet	No	A	Good	Mooseheart	May, 1927
M. McG.	10	5	134.9	53.1	33.6	74.00	74.50	+0.50	68.0	+0.50	+0.7	Just begun	No	B	Excellent	Mooseheart	May, 1927
A. F.	10	9	143.0	56.3	37.1	81.50	82.25	+0.75	79.0	+2.50	+3.2	Just begun	No	B	Excellent	Mooseheart	April, 1927
E. G.	10	9	132.1	52.0	30.5	67.00	67.50	+0.50	65.0	+2.00	+3.1	Not yet	No	A	Good	Mooseheart	May, 1927
B. W.	10	9	129.5	51.0	30.0	66.00	66.25	+0.25	63.0	+3.00	+4.8	Not yet	No	A	Good	Mooseheart	May, 1927
A. G.	11	0	138.4	54.5	37.9	83.31	80.75	−2.56	72.5	+10.80	+15.0	Yes	No	C	Excellent	Mooseheart	May, 1927
A. M.	11	0	139.7	55.0	38.0	83.50	83.75	+0.25	74.0	+9.50	+12.8	Yes	No	C	Good	Ridge Farm	March, 1927
M. J. P.	11	0	144.8	57.0	37.7	83.00			82.0	+1.00	+1.2	Just begun	No	B	Excellent	Home: Seattle	Dec., 1928
E.	11	1	148.1	58.3	40.3	88.75	90.00	+1.25	86.0	+2.75	+3.2	Just begun	No	B	Good	Theodora Home	Nov., 1928
O. M. D.	11	3	138.7	55.0	36.7	80.75	81.13	+0.38	74.0	+6.75	+9.1	Yes	No	C	Good	Mooseheart	May, 1927
A. R.	11	4	138.2	54.4	37.0	81.50	81.50	0.00	72.0	+9.50	+13.2	Not yet	No	A	Excellent	Mooseheart	May, 1927
M. H.	11	9	143.0	56.3	35.5	78.00	78.50	+0.50	78.5	−0.50	−0.6	Yes	No	C	Good	Ridge Farm	March, 1927
J. P.	11	10			39.8	87.50	89.25	+1.75				Yes	No	C	Good	Ridge Farm	March, 1927
Ed.	12	4	154.4	60.8	46.2	101.60	103.50	+1.90	98.0	+3.60	+3.7	Yes	No	C	Excellent	Theodora Home	Nov., 1928
M.	12	4	154.4	60.8	47.7	104.60	109.00	+4.40	98.0	+7.00	+7.2	Yes	No	C	Excellent	Theodora Home	Nov., 1928

E. B.	12	5	148.6	58.5	48.5	106.75	106.25	−0.50	88.0	+18.25	+20.7	Yes	Yes	D	Good	Moosehart	May, 1927
C. G.	12	5	146.8	57.8	38.8	85.25	85.50	+0.25	85.0	+0.25	+0.3	Yes	No	C	Good	Mooseheart	May, 1927
M. F.	12	6	146.8	57.8	36.3	80.19	81.19	+1.00	86.0	−5.81	−6.8	Yes	No	C	Good	Mooseheart	May, 1927
A. B.	12	7	165.8	65.3	67.0	146.50	145.50	−1.00	120.0	+26.50	+21.2	Yes	No	C	Excellent	Home: Chicago	March, 1927
E. S.	12	7	155.2	61.1	46.6	102.50	101.25	−1.25	101.0	+1.50	+1.2	Yes	Yes	D	Good	Mooseheart	April, 1927
D. H.	12	10	140.5	55.3	38.6	85.00	85.50	+0.50	77.8	+7.75	+10.0	Just begun	No	B	Good	Mooseheart	April, 1927
R. P.	12	10	151.1	59.5	42.8	94.25	96.25	+2.00	95.0	−0.75	−0.8	Yes	No	C	Good	Mooseheart	May, 1927
S. S.	12	10	151.9	59.8	47.5	104.50	105.00	+0.50	96.0	+8.50	+8.9	Just past	Yes	D	Excellent	Mooseheart	May, 1927
G. P.	12	11	150.1	59.1	53.9	118.50	119.75	+1.25	92.0	+26.50	+28.8	Just past	Yes	D	Good	Mooseheart	May, 1927
F. W.	12	11	143.0	56.3	44.4	97.75	97.75	0.00	81.8	+6.00	+7.3	Yes	Yes	D	Good	Mooseheart	May, 1927
L. H.	13	3	157.7	62.1	53.9	118.50	117.25	−1.25	106.0	+12.50	+11.8	Just past	Yes	D	Good	Mooseheart	May, 1927
V. S.	13	4	167.1	65.8	56.3	123.75	126.00	+2.25	123.0	+0.75	+0.6	Just past	Yes	D	Excellent	Mooseheart	May, 1927
B. T.	13	4	153.1	60.3	49.0	107.75	108.00	+0.25	98.0	+9.75	+10.0	Yes	No	C	Excellent	Home: Chicago	March, 1927
D. M.	13	9	163.8	64.5	57.9	127.75	127.50	−0.25	118.0	+9.75	+8.0	Just past	Yes	D	Excellent	Home: Seattle	Jan., 1929
K. S.	13	10	160.7	63.3	51.1	112.31	113.50	+1.29	113.0	−0.69	−0.6	Just past	Yes	D	Good	Mooseheart	April, 1927
M. R.	13	11	158.7	62.5	42.9	108.75	109.94	+1.19	109.0	−0.25	−0.2	Yes	No	C	Good	Mooseheart	April, 1927
M. St.	14	0	161.0	63.4	55.8	122.75	122.75	0.00	114.0	+8.75	+7.7	Just past	Yes	D	Good	Mooseheart	May, 1927
M. S.	14	2	150.1	59.2	52.7	115.25	115.25	0.00	96.0	+19.25	+20.0	Past	Yes	E	Good	Mooseheart	May, 1927
N. M.	14	5	161.3	63.5	61.2	134.56	135.13	+0.57	115.0	+19.56	+16.9	Just past	Yes	D	Good	Mooseheart	April, 1927
J. K.	14	7	158.7	62.5	61.0	134.25	134.00	−0.25	114.0	+20.25	+17.8	Past	Yes	E	Excellent	Mooseheart	May, 1927
V. F.	14	8	158.2	62.3	51.4	126.50	126.75	+0.25	113.0	+13.50	+11.9	Just past	Yes	D	Excellent	Mooseheart	April, 1927
M. Hi.	14	10	167.1	65.8	67.5	148.44	148.44	0.00	124.0	+24.44	+19.7	Just past	Yes	D	Excellent	Mooseheart	April, 1927
C. McC.	15	0	162.7	64.0	64.8	142.50	141.75	−0.75	119.0	+23.50	+19.9	Past	Yes	D	Good	Home: Chicago	Feb., 1927
G. R.	15	0	138.4	54.5	37.5	82.50	83.25	+0.75	77.0	+5.50	+7.1	Yes	Yes	D	Good	Ridge Farm	March, 1927
G. D.	15	1	160.8	63.3	55.7	122.50	123.75	+1.25	116.0	+6.50	+5.6	Past	Yes	E	Good	Mooseheart	May, 1927
J. D. M.	15	7	154.4	60.8	51.0	112.25	112.25	0.00	111.0	+1.25	+1.1	Past	Yes	E	Excellent	Mooseheart	May, 1927
J. R.	16	0	152.7	60.1	51.5	113.25	113.00	−0.25	105.0	+8.25	+7.9	Past	Yes	E	Good	Mooseheart	May, 1927
G. W.	16	4	157.0	61.8	64.0	140.75	139.25	−1.50	114.0	+26.75	+23.4	Past	Yes	E	Good	Mooseheart	April, 1927
D. W.	16	4	164.6	64.8	59.8	131.50	130.50	−1.00	122.0	+9.50	+7.8	Past	Yes	E	Excellent	Mooseheart	May, 1927
N. G.	16	9	161.3	63.5	59.0	130.50	130.00	−0.50	120.0	+10.50	+8.8	Past	Yes	E	Excellent	Mooseheart	May, 1927
O. S.	17	0	163.8	64.5	54.5	120.00	121.50	+1.50	122.0	−2.00	−1.6	Past	Yes	E	Good	Mooseheart	May, 1927

were made in three of these cottages. Although we were interested primarily in well-nourished girls of 10 to 16 years of age, it did not seem wise to select children for special observation. All girls in the three cottages were, therefore, included. Of these 80 girls, 38 were considered to be in good or excellent physical condition, and their records are included in this report. The height, weight, and nutritional condition of each girl are given in Table 2.

Method of study

The method of determining the food intakes of the children varied somewhat with the type of situation. In each case, however, an accurate record of all food eaten was kept for a week's time. The value of the diet was then either calculated, using tables of average composition of raw foods (21, 22), or determined by burning in the oxy-calorimeter.

Determination of caloric values by the oxy-calorimeter. The oxy-calorimeter devised by Benedict and Fox (5) was used to determine the caloric values of the diets of the six girls in their own homes, and of the four girls in the Theodora Home. After a period of instruction and a day or so of demonstration or supervision, the diets were weighed and the records kept by the girls themselves, with the assistance of their mothers (or house mother in case of the institution girls). Samples of all foods were put into tightly corked bottles to avoid loss of moisture. The observer called at the home each day to go over records, to answer questions, and to get the samples. In every case both the girl and her mother were intelligent and interested in the study, and we have every reason to believe that their records are dependable. There was no indication of a decrease in food intake due to tedium from the mechanics of the study, as found by Bedale, save perhaps in the case of one girl whose mother thought the child had not eaten quite her usual amount during the latter half of the week because of the weighing. The results, however, showed a decrease for the last day only.

The samples of food were brought to the laboratory, and weighed portions were dried on a steam bath at low enough temperature to prevent charring or excessive caramelization of sugar. Weighed samples of this dried residue were then burned in the oxy-calorimeter, as outlined below. Since the method has been described in detail by Benedict and Fox, only the main outlines will be given here.

Briefly stated, the oxy-calorimeter is an apparatus for determining the calories produced in the burning of a food indirectly by measuring the oxygen consumed. A weighed sample of food is burned in a small com-

bustion chamber in a current of nearly pure oxygen which circulates through a spirometer connected with this chamber, and through a can of soda lime to remove the carbon dioxide. The volume of oxygen consumed is also corrected for the nitrogen gas freed during combustion, reduced to standard conditions, and the calories produced in the burning computed. The value for convenience is expressed as calories per gram. In the present study, following Benedict's suggestion, the factor 4.825, which is the calorific value of a liter of oxygen consumed by an individual under basal conditions, was used for food mixtures in general, although for some foods high in fat and for those largely carbohydrate the calorific value of a liter of oxygen was considered to be 4.7 and 5 respectively.

To make the correction for nitrogen, actual analyses were made only of food mixtures having a high percentage of protein, of those for which no analyses were available, and of all composite samples. Nitrogen was determined by an adaptation of the Kjeldahl-Nessler method as modified by Koch and McMeekin (15). For foods low in protein the nitrogen content was estimated. This seemed justified since in most of these cases the amount of total nitrogen evolved fell within the range of experimental error.

The oxy-calorimeter has several advantages which make its use in laboratories more generally feasible than that of the bomb calorimeter. The initial expense of the first is much less, and the technic involved in its operation is simpler and less time consuming, although the results obtained may not be so accurate. However, Benedict and Fox found that the calorific value of oxygen from a number of pure substances as obtained by both the oxy-calorimeter and the bomb calorimeter agreed perfectly with the theoretical values. They consider the possible error in the determination of the energy values of foods by either method less than that involved in the most careful sampling of food, which they state may be as great as five per cent or more. In this study the accuracy of the data was questioned unless the figures from two or more burnings of the sample checked within two per cent or less.

In the first few studies the values of simple foods, such as milk, butter, and sugar, were computed from tables of average composition (2, 20), the oxy-calorimeter being used for mixed foods and ones for which no analyses were available. The preparation of these for burning involved some difficulties. Bakery products, such as rolls, bread, cakes, and cookies, were first dried and the dried residue reduced to a homogeneous mass by grinding in a mortar. Fresh green vegetables to which no fats

had been added and meats were handled in the same way. Other foods such as egg or gelatine mixtures, potatoes, fruits, and material such as jams which contained a large quantity of a heavy syrup, became of such consistency in the process of drying that it was impossible to grind them at all. These foods were either macerated in a mortar or put through a wire sieve while moist and the pulp or purée dried. Foods high in fat presented particular difficulties because of the tendency of the fat to separate out even when the material was dried in the form of a purée. Great care was necessary to prevent the loss of fat in the handling and to obtain a representative sample for burning. It was found impossible to reduce a few things to a homogeneous mass as, for example, candy bars which are a sticky mass neither soft nor hard nor brittle. In all cases in which the material could not be reduced to a satisfactory state of homogeneity, burnings were made until the whole sample was used or at least five had been made, and the average taken.

Because of the difficulty of reducing many individual foods to homogeneous dried samples and because of the time required for so many analyses, this procedure was used in only four cases. Later, however, a modification of the method which had been used by Blair (6) in her observations of the food consumption of superior preschool children was adopted. Composites of aliquot parts of all foods eaten by the child each day were made, analyzed for nitrogen, and the energy value determined by the use of the oxy-calorimeter. Before sampling, all foods whether raw or cooked were forced through a wire sieve. The well-mixed composites were dried carefully, first over a water bath and finally in an electric oven at 60° centigrade. They were more easily handled than many of the samples of single foods and the results checked more closely. For this reason it would seem that the analysis of composite samples is not only less laborious but gives more accurate results than are obtained from the analysis of many individual foods. The use of the oxy-calorimeter for making determinations on composite samples of the food eaten proved to be a satisfactory, feasible method for studying the energy intake of children.

Calculation of the energy value of diets through kitchen studies. The food value of the diets of the children at Ridge Farm and at Mooseheart was largely calculated by the use of accepted tables for the composition of raw materials, and the computation of the composition of the cooked foods and food mixtures through the so-called "kitchen" studies as described by Roberts and Waite (19). In these "kitchen" studies all

raw ingredients used in preparation and any fat lost in cooking were weighed as well as the final product, and from these figures the value of the cooked food was obtained. In weighing large amounts a Fairbanks platform scale weighing accurately to one ounce was used, and for small amounts a dietetic spring scale. By this method satisfactory data were obtained as a rule. However, even though all cooks were willing to coöperate and were most faithful, incomplete data were occasionally obtained. In such cases samples of the foods were taken and their values determined by the oxy-calorimeter, as were likewise those of a number of commercially prepared foods for which no analyses were available. The oxy-calorimeter was thus of great value in increasing the accuracy of the data in the calculated dietary studies.

FINDINGS

The findings from these studies are given in detail in Table 3. The energy intakes have been considered from the number of standpoints including: total calories in relation to age, weight, and height; calories per kilogram of body weight and per centimeter of height; calories per kilogram referred to height; and the calorie intake at different "physiological" ages. The individual variation in food intake is also discussed.

Total daily calories, referred to single measures of development

Referred to age. The most commonly used method of expressing the total energy requirements of children is as total calories per 24 hours per age. The data from the present study offer little support for this method with girls of the age range studied. As shown in Table 3 and Chart I, the variation in daily intake for the group was great, and equally so for any given age. For the 12-year-olds, the range was from 2925 to 1649 calories, a difference of 1276 calories, or about 80 per cent between the maximum and minimum values. The most striking impression given by the scatter plot is, indeed, one of wide variation with little relation to age, an observation evidenced by the low correlation coefficient, $+.09 \pm .093$, between calories and age.

The finding is not surprising in view of the great variation in size of children of these years, in their activity, and also in their rate of growth. The 12-year-old girls of this study ranged from 56 to 65 inches in height, and from 79 to 149 pounds in weight, and they might be expected therefore to vary accordingly in respect to their energy needs. Their degree of activity doubtless also varied considerably though no great differences

TABLE 3

Energy intake of well-nourished adolescent girls

GIRL	AGE	WEIGHT	HEIGHT	NUMBER OF EXPERIMENTAL DAYS	CALORIES DETERMINED BY	TOTAL DAILY INTAKE				CALORIES PER KILOGRAM	CALORIES PER CENTIMETER
						Protein	Fat	Carbohydrate	Calories		
	years	*kgm.*	*cm.*			*grams*	*grams*	*grams*			
C. M.	8	25.6	124.7	7	Calc.	51.5	73.0	223.9	1,765	69.3	14.2
L. T.	8	26.9	124.0	7	Calc.	54.5	88.2	281.9	2,156	80.0	17.4
B. M.	9	32.7	131.8	5	Anal.	68.2			2,256	68.9	17.1
K.	10	37.5	134.6	6	Anal.	64.4			2,255	60.0	16.7
F. H.	10	27.5	132.8	7	Calc.	64.6	85.8	264.5	2,041	74.2	15.4
E. R.	10	37.3	135.9	7	Calc.	75.2	61.3	301.9	2,268	60.8	16.7
R. S.	10	28.7	131.0	7	Calc.	51.6	72.8	228.4	1,822	63.1	13.9
M. McG.	10	33.6	134.9	7	Calc.	70.3	99.9	370.0	2,669	79.3	19.8
A. F.	10	37.1	143.0	7	Calc.	87.4	97.2	343.9	2,532	68.3	17.7
E. G.	10	30.5	132.1	7	Calc.	57.9	86.4	251.2	2,018	66.3	15.3
B. W.	10	30.0	129.5	7	Calc.	61.4	88.4	270.8	2,120	70.7	16.4
A. G.	11	37.9	138.4	7	Calc.	61.5	91.5	307.7	2,329	61.5	16.8
A. M.	11	38.0	139.7	6	Calc.	94.3	109.7	306.3	2,598	68.5	18.6
M. J. P.	11	37.7	144.8	7	Anal.	72.4			1,921	50.3	13.3
E.	11	40.3	148.1	5	Anal.	66.9			1,723	42.7	11.7
O. M. D.	11	36.7	139.7	6	Calc.	56.7	90.6	313.1	2,307	62.8	16.5
A. R.	11	37.0	138.2	7	Calc.	64.7	86.3	306.1	2,296	61.9	16.6
M. H.	11	35.5	143.0	7	Calc.	94.9	110.0	304.0	2,550	71.9	17.8
J. P.	11	39.8		7	Calc.	95.9	116.2	320.6	2,687	67.6	
Ed.	12	46.2	154.4	6	Anal.	58.4			1,802	39.0	11.7
M.	12	47.7	154.4	7	Anal.	56.8			1,649	34.5	10.7
E. B.	12	48.5	148.6	7	Calc.	63.3	85.2	280.2	2,135	44.2	14.4
C. G.	12	38.8	146.8	7	Calc.	69.2	99.7	319.2	2,414	62.3	16.5
M. F.	12	36.3	146.8	7	Calc.	86.4	101.8	328.3	2,560	70.4	17.5
A. B.	12	67.0	165.8	6	Anal.	97.4			2,925	43.7	17.6
E. S.	12	46.6	155.2	7	Calc.	86.7	108.1	360.4	2,690	57.7	17.3
D. H.	12	38.6	140.5	7	Calc.	74.9	89.0	290.7	2,216	57.4	15.8
R. P.	12	42.8	151.1	7	Calc.	58.0	94.6	391.1	2,241	52.3	14.8
S. S.	12	47.5	151.9	7	Calc.	61.8	89.0	240.3	2,052	43.2	13.5
G. P.	12	53.9	150.1	7	Calc.	75.6	110.6	285.0	2,453	45.5	16.3
F. W.	12	44.4	143.0	7	Calc.	61.7	90.1	267.2	2,168	48.8	15.2
L. H.	13	53.9	157.7	7	Calc.	73.6	107.7	391.5	2,657	49.3	16.8
V. S.	13	56.3	167.1	7	Calc.	75.9	95.9	319.5	2,453	43.6	14.7
B. T.	13	49.0	153.1	7	Anal.	76.9			2,915	59.2	19.0
D. M.	13	57.9	163.8	7	Anal.	83.8			2,275	39.3	13.9
K. S.	13	51.1	160.7	7	Calc.	80.6	116.8	348.3	2,668	52.3	16.6
M. R.	13	43.9	158.7	7	Calc.	85.3	92.7	362.8	2,647	61.7	16.7
M. St.	14	55.8	161.0	7	Calc.	59.4	97.1	267.7	2,192	39.4	13.6
M. S.	14	52.7	150.1	7	Calc.	54.5	73.8	230.9	1,824	34.7	12.1
N. N.	14	61.2	161.3	7	Calc.	91.6	96.3	357.8	2,673	43.7	16.6
J. K.	14	61.0	158.7	7	Calc.	65.6	104.1	289.7	2,376	38.9	15.0

TABLE 3—*Concluded*

GIRL	AGE	WEIGHT	HEIGHT	NUMBER OF EXPERIMENTAL DAYS	CALORIES DETERMINED BY	TOTAL DAILY INTAKE				CALORIES PER KILOGRAM	CALORIES PER CENTIMETER
						Protein	Fat	Carbohydrate	Calories		
	years	*kgm.*	*cm.*			*grams*	*grams*	*grams*			
V. F.	14	51.4	158.2	7	Calc.	89.3	110.8	353.7	2,726	53.1	17.2
M. Hi.	14	67.5	167.1	7	Calc.	96.3	110.8	361.2	2,801	41.5	16.8
C. McC.	15	64.8	162.6	7	Anal.	67.4			2,357	36.4	14.5
G. R.	15	37.5	138.4	5	Calc.	96.5	119.5	316.8	2,723	72.6	19.7
G. D.	15	55.7	160.8	7	Calc.	64.3	87.0	257.7	2,138	38.3	13.3
J. D. M.	15	51.0	154.4	6	Calc.	51.4	77.1	242.5	1,883	36.9	12.2
J. R.	16	51.5	152.7	6	Calc.	68.3	95.7	286.6	2,286	44.4	15.0
G. W.	16	64.0	157.0	6	Calc.	77.1	91.3	290.5	2,268	35.1	14.5
D. W.	16	59.8	164.6	5	Calc.	56.2	78.6	244.4	1,912	32.0	11.6
N. G.	16	59.0	161.3	6	Calc.	62.4	84.4	257.8	2,038	34.5	12.6
O. S.	17	54.5	163.8	7	Calc.	62.9	93.7	255.0	2,070	38.0	12.6
Average						71.2	94.2	299.8	2,298	53.3	15.5

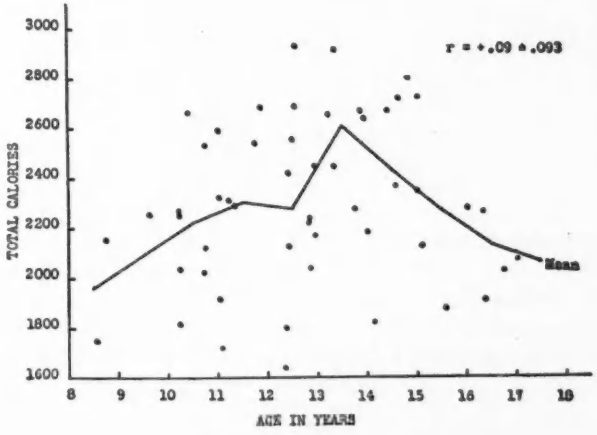

CHART I. TOTAL CALORIE INTAKE OF 52 ADOLESCENT GIRLS REFERRED TO AGE

were observable. All were in school, and free play out-of-doors for the five school days was limited to two or three hours a day. It is probable, however, that had exact methods of recording activity been available marked individual differences in activity might have been observed. At any age these girls also varied greatly in rate of growth in both height

and weight. Some of the 12-year-olds, for example, were just beginning to show an increased rate of gain in height, others were obviously in the period of rapid growth both in height and weight, one girl having gained an inch in height and 10 pounds in weight in the three months just preceding the study, while still others had already passed the peak of growth. Such variations in rate of growth most probably affected their total calorie requirements.

In view of the low correlation between calories and age, the mean intakes per age are of less significance than is usually attributed to them. Since, however, intakes are commonly reported on this basis, the averages for these 52 girls are given in Table 4. The curve of the means is also plotted in Chart I. Considering the ages 10 to 16 years—for which there

TABLE 4

Maximum, minimum, and mean total calorie intakes of adolescent girls at each age

AGE	NUMBER OF GIRLS	MAXIMUM CALORIES	MINIMUM CALORIES	DIFFERENCE, CALORIES	MEAN CALORIES
years					
8	2	2,156	1,765	391	1,961
9	1				2,256
10	8	2,669	1,822	847	2,216
11	8	2,687	1,723	964	2,301
12	12	2,925	1,649	1,276	2,275
13	6	2,915	2,275	690	2,603
14	6	2,726	1,824	902	2,432
15	4	2,723	1,883	840	2,275
16	4	2,286	1,912	274	2,126
17	1				2,070

Coefficient of correlation: $+.09 \pm .093$.

are a fair number of cases—the mean calories are seen to rise from 2216 at 10 years to a peak of 2603 at 13 years, and drop again to 2126 at 16 years. Whether or not this peak is a significant one cannot be determined until larger numbers are available at each of these ages. It is of interest to note, however, that a compilation of all intakes of normal children reported in the literature shows the same picture—a rise to 14 years, followed by a drop. Such a peak is indicated moreover by both the Holt and Hawley standards, though not by the early ones of Gillett or Atwater (Chart II).

The most surprising thing in the results of this study, is that the intakes were no higher. The standards previously set by Holt, as well as the averages of Bedale, had led us to expect averages above 3000 calories.

Yet the highest mean intake for any age in this study was 2603 calories, and the average for only two individuals was as high as 2900 calories. The curve of the means for the present study, together with commonly used standards, are shown in Chart II. It will be noted that the averages for this study do not differ appreciably from the Holt and Hawley curves at the earlier years, though they are slightly higher. After the eleventh year, however, the curve is markedly below Holt's and somewhat lower than Hawley's. It will be recalled that both the Holt and Hawley standards are largely theoretical at these older years, very few actual

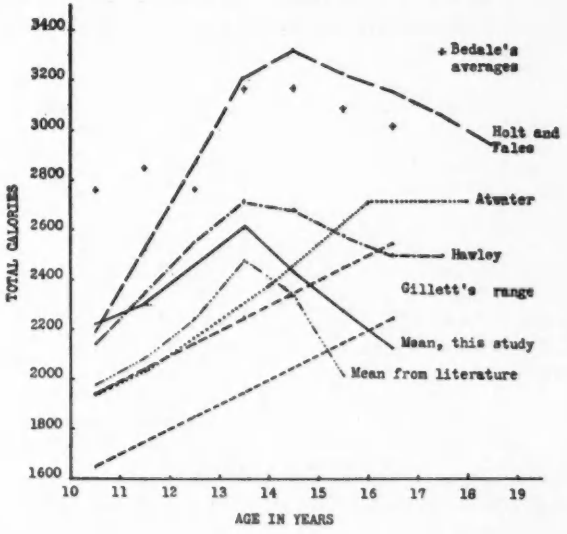

CHART II. MEAN CALORIE INTAKE OF GIRLS IN THIS STUDY, AND THOSE IN THE LITERATURE, AS COMPARED WITH STANDARDS

cases having been available for their construction. Holt's curve is definitely above his own few cases; moreover, as Hawley points out, in constructing his curve he allowed twice for losses in digestion (11). Hawley's curve, which is supported by her own observations on a few girls of these ages during a controlled laboratory experiment of several weeks, is definitely under Holt's for the older years. The curve of the present study is based on actual intakes of a reasonable number of healthy, moderately active girls, and to this extent can be defended. The smoothed curve prepared from individual studies in the literature,

of moderately active girls, shows the same trend but is definitely lower. As stated earlier, some of the data used in the latter may be open to question.

The writers are inclined to believe that the smoothed curve of their own study may be fairly representative of the average energy needs of *moderately active* school girls. Since these values closely approximate those of Hawley's proposed standard, the latter may probably serve as a convenient standard until the data have been sufficiently extended to warrant more exact statements. There are at present no data to support Holt's theoretical curve, save Bedale's averages. Future studies, possibly, may validate these high values for very active girls of these years.

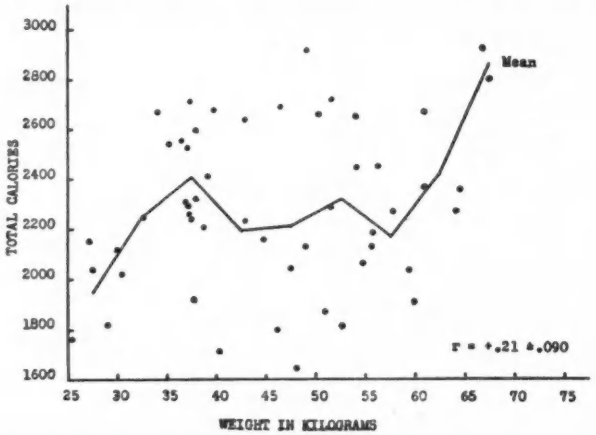

CHART III. TOTAL CALORIES OF 52 ADOLESCENT GIRLS REFERRED TO WEIGHT

It should be emphasized again, however, that age *per se* is a very poor basis for prediction of energy needs, and should probably be used only for rough estimation when no other criteria are available. In such cases a wide allowance must be made for individual variation.

It is pertinent next to inquire whether a closer relationship exists between total calories and body size, as measured by either of the easily obtained values, weight and height.

Referred to weight. Camerer (8) assumed from his studies on his own children that the energy requirements of children increased steadily with body weight irrespective of age, and he set up his proposed standards on this basis. Other workers, including Holt (13), have done likewise. The data presented in this report indicate that this assumption does not hold

true for adolescent girls. The curve of the means does show some such tendency, but this is largely at the ends of the curve where the cases are too few to be decisive (Table 5, Chart III). The averages for girls weighing 30 to 64 kilograms fluctuate irregularly from 2200 to 2400 calories. The picture given in Chart III is one of great scatter, which is adequately expressed by the coefficient of correlation $+.21 \pm .090$. This is not significantly higher than the correlation for calories and age.

Referred to height. From her studies of the basal metabolism of adolescent girls, MacLeod (16) suggests that there is a relationship between the basal metabolism and the height of the girl. It seemed probable that the same relation might exist between total calorie intake and height.

TABLE 5

Total calorie intake of girls referred to body weight and body height

CALORIES REFERRED TO WEIGHT			CALORIES REFERRED TO HEIGHT		
Weight	Number of girls	Average daily calories	Height	Number of girls	Average daily calories
kgm.			*cm.*		
25–29	4	1,946	120–124	2	1,961
30–34	4	2,266	125–129	1	2,120
35–39	14	2,404	130–134	6	2,177
40–44	4	2,195	135–139	6	2,420
45–49	6	2,207	140–144	5	2,277
50–54	8	2,321	145–149	4	2,208
55–59	6	2,168	150–154	9	2,123
60–64	4	2,419	155–159	6	2,561
65–69	2	2,863	160–164	9	2,258
			165–169	3	2,726

Coefficient of correlation: total calories and weight, $+.21 \pm .090$; total calories and height, $+.26 \pm .088$.

The data from this study do not, however, bear out this assumption. The curve of the means (Table 5 and Chart IV) shows a slight tendency to rise with increased height, but the scatter is great and the coefficient of correlation only $+.26 \pm .088$. While this value for r is slightly higher than that for total calories and either age or weight, it is not significantly so, and it is likewise too low to be of practical value.

It is clear from the foregoing that for the subjects of this study the total calories are not directly proportional to any single one of the three common measures of stage of development—age, weight, or height. The next step obviously is to determine whether a closer relationship is found when calories are considered in respect to two, rather than merely one of these factors.

Calories referred to combinations of two measures of development

Calories per kilogram per age. Next to total calories per day, the energy requirement of an individual is most frequently expressed as calories per kilogram per 24 hours. Rubner (21) in 1885 showed that

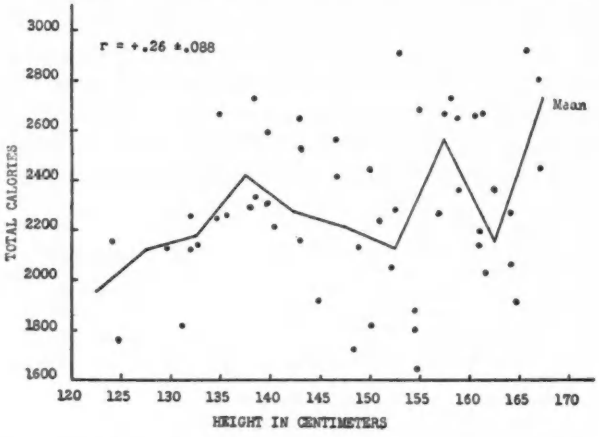

CHART IV. TOTAL CALORIE INTAKE OF 51 ADOLESCENT GIRLS REFERRED TO HEIGHT

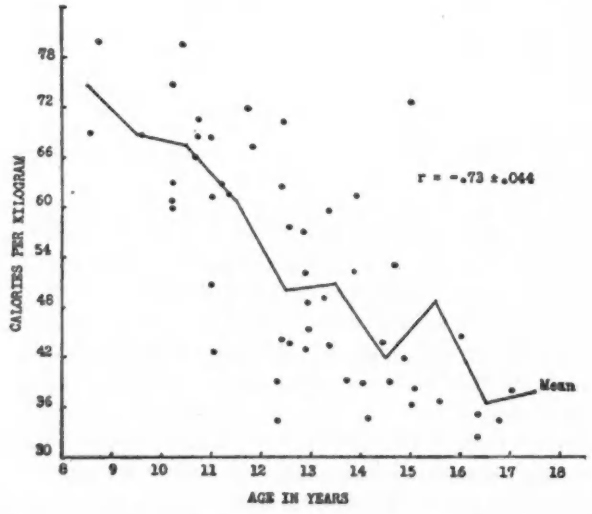

CHART V. CALORIE INTAKE PER KILOGRAM OF 52 ADOLESCENT GIRLS REFERRED TO AGE

there is a decreased energy production per kilogram of body weight with age. His observations have been confirmed by later investigators with the exception of Holt (13) who assumed that the caloric intake per kilogram remains quite constant from 6 to 14 years for girls, with a slight rise at 11 to 13 years, due to rapid growth at that age. The data on the girls of this study agree with the earlier observations that the calories per kilogram decrease rather consistently with age. This is obvious from Table 6 and Chart V. The curve of the means shows a gradual decrease with age, from 74.7 calories at 8 years to 38 calories at 17 years, and does not show a pubescent rise as suggested by Holt. The individual intakes also cluster fairly closely around the means, giving the relatively high

TABLE 6

Calorie intake per kilogram of body weight and per centimeter of height at each age

AGE	PER KILOGRAM			PER CENTIMETER		
	Number of girls	Average calories	Smoothed values	Number of girls	Average calories	Smoothed values
years						
8	2	74.7		2	15.9	16
9	1	68.9		1	17.1	16
10	8	67.8	70	8	16.5	16
11	8	61.0	65	7	15.9	16
12	12	49.9	60	12	15.1	16
13	6	50.9	55	6	16.3	16
14	6	41.9	50	6	15.2	16
15	4	46.1	45	4	14.9	15
16	4	36.5	40	4	13.4	14
17	1	38.0		1	12.7	13

Coefficient of correlation: calories per kilogram and age, $-.73 \pm .044$; calories per centimeter and age, $-.33 \pm .085$.

coefficient of correlation of $-.73 \pm .044$. It is clear, therefore, that the total daily calories for these 52 girls could be predicted far better from a combination of weight and age than from either alone.

A comparison of the intake of these girls with those of earlier studies showed that their intake per unit of weight at any given age was lower, while their total intake was higher. Evidently the girls observed in this investigation were on the average larger for their age than the individuals previously reported.

Calories per centimeter per age. Since the relation of calories to weight was improved by the introduction of the factor of age it was logical to expect that calories per centimeter per age would yield a fairly close

relationship. Table 6 and Chart VI show that such was not the case. The means of the intakes per centimeter decrease but slightly with age, remaining quite constant at least until 15 years when there is more of a

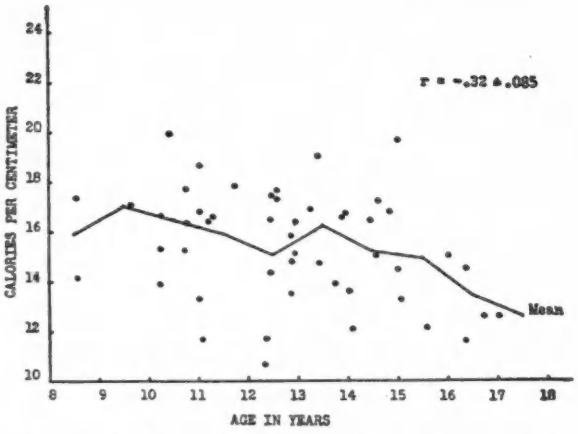

CHART VI. CALORIE INTAKE PER CENTIMETER OF 51 ADOLESCENT GIRLS REFERRED TO AGE

TABLE 7

Calorie intake per kilogram referred to height in centimeters

HEIGHT	NUMBER OF GIRLS	CALORIES PER KILOGRAM	SMOOTHED VALUES
cm.			
120–124	2	74.7	
125–129	1	70.7	
130–134	6	68.7	70
135–139	6	64.7	65
140–144	5	59.5	60
145–149	4	54.9	55
150–154	9	43.3	50
155–159	6	49.3	45
160–164	9	39.3	40
165–169	3	42.9	

Coefficient of correlation: $-.80 \pm .034$.

drop. Blunt and Tilt, in their studies on the basal metabolism of girls, obtained similar results, the calories per centimeter per 24 hours being quite consistent irrespective of the age of the child. In the present study there is considerable scatter of the individual cases and the correlation as

indicated by the coefficient of $-.33 \pm .085$ is barely significant. It will be recalled that height alone showed a correlation of $+.26$ with total calories and it appears that this relation is little influenced by age. If height were therefore to be used in prediction of calories for adolescent girls, there would apparently be no advantage of taking age into consideration. The relation of height to calories was not, however, sufficiently high for the girls of this study to justify its use save in rough approximations. In such cases, 16 calories per centimeter for girls 8 to 15 years of age might give some rough estimate of the energy needs.

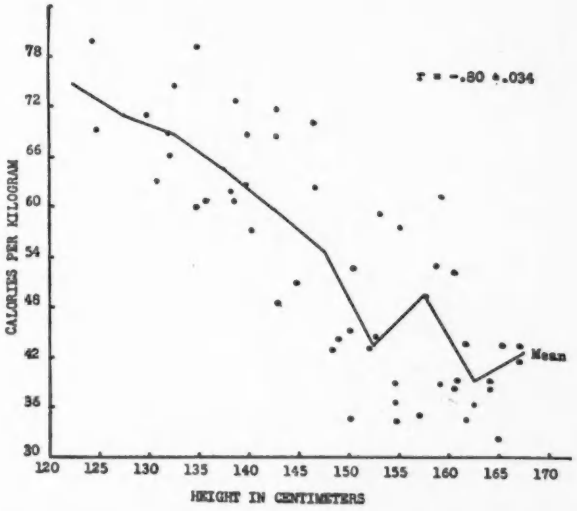

CHART VII. CALORIE INTAKE PER KILOGRAM OF 51 ADOLESCENT GIRLS REFERRED TO HEIGHT

Calories per kilogram per centimeter. It is well-known that both height and weight are better measures of physical development than chronological age. It was suggested, therefore, that calories per kilogram per centimeter might prove a good basis for prediction of energy needs. Table 7 and Chart VII show this to be true. The intakes per kilogram decrease rather consistently with increase in height, from 74.7 calories at 120 to 124 centimeters, to 42.9 calories at 164 to 169 centimeters. The individual values, moreover, cluster fairly closely around the curve of the means, yielding the relatively high coefficient of correlation of $-.80 \pm .034$. This is a slightly higher value than for calories per kilogram and

age (−.73), but the difference is not significant. It would appear, therefore, that the energy needs of these 52 girls could have been predicted about equally well by either of these two methods.

Calorie intake referred to "physiological" age

As stated earlier in this discussion, variations in the rate of growth, as well as in age, size, and activity, probably influence the energy needs of adolescent girls. With this in mind the girls were grouped according to their physiological development into five so-called "physiological" age groups irrespective of chronological age or size. This age was approxi-

TABLE 8

Mean calorie intake at different "physiological" ages

AGE	AVERAGE AGE		MEAN WEIGHT	MEAN HEIGHT	NUMBER OF GIRLS	TOTAL CALORIES	CALORIES PER KILOGRAM	NUMBER OF GIRLS	CALORIES PER CENTIMETER
	Years	Months							
			kgm.	*cm.*					
A	10	1	31.4	131.5	10	2,100	67.5	10	16.0
B	11	3	37.5	142.3	5	2,212	59.7	5	15.7
C	12	0	43.0	149.3	13	2,433	58.1	12	16.2
D	13	9	53.0	155.7	14	2,469	47.6	14	15.9
E	15	6	56.6	159.0	10	2,125	37.6	10	13.4

mated from the rapidity of the girl's growth and whether or not she had menstruated, as follows:

Physiological age A—Those girls who had not yet entered into the period of rapid growth nor menstruated.

Physiological age B—Those girls who had begun to show an increase in rate of growth in height but had not menstruated.

Physiological age C—Those girls who were definitely in the period of rapid growth both as to height and weight but had not menstruated.

Physiological age D—Those girls who were still gaining rapidly or had just passed the peak of rapid growth and who had menstruated.

Physiological age E—Those older adolescent girls who were definitely past the period of rapid growth and had menstruated.

The results of this analysis as given in Table 8 and Chart VIII are such as might have been expected from the preceding analyses. The mean total intake was somewhat higher for the rapidly growing girls of ages C and D than for the younger or older ages A, B, and E; the per kilogram intake dropped from age A to age E, while the intake per centimeter was quite constant with the exception of that of age E which was

lower. Although no great increase in energy needs of girls for pubescent growth is indicated, it seems logical to conclude that the lessened intake by the older girls, in part at least, may be attributed to an increase in the energy demands for growth. The possibility of a relatively greater intake of the girls of ages C and D than is commensurate with gain in weight is

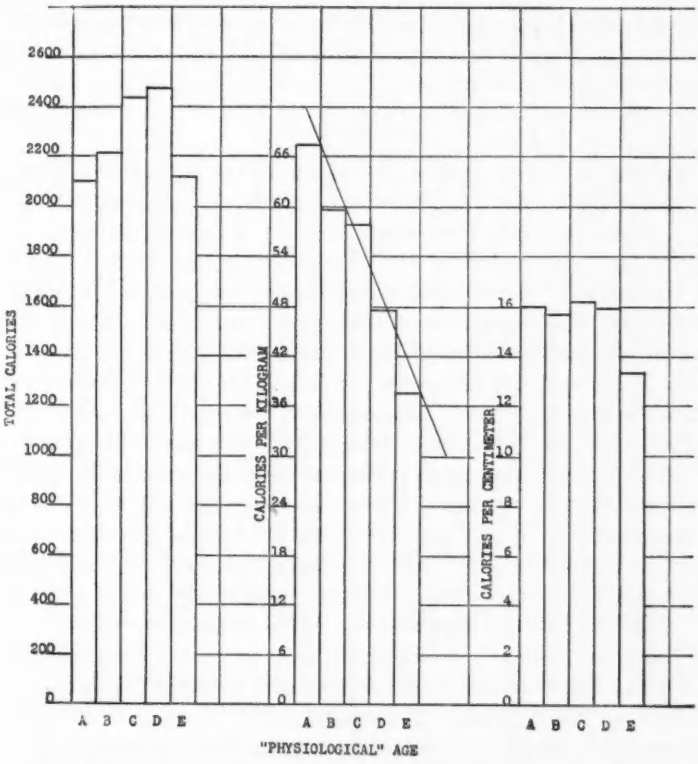

CHART VIII. TOTAL, PER KILOGRAM, AND PER CENTIMETER CALORIE INTAKE OF ADOLESCENT GIRLS REFERRED TO "PHYSIOLOGICAL" AGE

suggested by the calorie per kilogram intake. As shown in Chart VIII, the mean values for these ages are slightly above the straight line representing a steady decrease from 67.5 calories per kilo at age A, to 37.6 calories at age E. It is interesting that the mean calorie intake per unit of height is constant here as when referred to chronological age.

The great variation in the individual energy intakes at different

"physiological" ages emphasizes the great variability in the energy needs of adolescent girls particularly in pubescence. While it is probable that for any individual the need reaches a peak during the period of most rapid growth as has been assumed from general observation of children of these ages, so many factors play a part in every case that within any group the range of intakes is great and the trend almost masked by the great scatter. However, when more than one variable is taken into consideration the results are more consistent and the mean values have greater weight.

STANDARDS

As stated at the outset, it was hoped that this investigation might yield adequate data for the establishment of standards. Although this hope has not been realized, some conclusions are apparent that may be of practical use. It is obvious first of all, that for girls 10 to 17 years of age estimation of calorie needs on the basis of age is little better than a mere guess. There would seem to be no justification for the use of this method save perhaps in cases where no data other than age are obtainable, as for example, in large scale group feeding. In such cases a liberal yet not excessive calorie allowance should be employed. The present study would indicate that from 2200 to 2600 calories should be adequate for well-nourished, moderately active school girls of these years. Undernourished children or excessively active ones, such as girls in summer camps, will need a more liberal allowance. The values obtained in this study are somewhat below the theoretical curve of Hawley. The latter would therefore appear to be a generous standard for average children, and since any error should be on the side of generosity, the writers are inclined to use this standard as a tentative one until further data are available. There are as yet no actual studies to justify Holt's very high allowances for these years. It seems probable, however, that they may prove to be the upper limits of the normal range from the average requirements, or in other words, the requirements for large and very active girls.

In most cases where calorie prediction is desired—as in clinical work, research, and family relief—height and weight, as well as age, could be obtained, and thus a far more accurate estimate of caloric needs could be made. With height known, even if the age-calorie standard is to be used, allowance could be made for difference in size by assuming the child to be the age corresponding to his height. A large 10-year-old, for example, would be classed as a 12-year-old and receive the latter's

calorie allowance. For quick estimation, 16 calories per centimeter (or about 40 per inch) would give a rough approximation for girls of these ages.

A better prediction could be made on the basis of calories per kilogram, either in relation to age or to height. Smoothing the calories per kilogram of the present study gives values decreasing by about 5 calories per year from 70 calories at 10 years to 35 calories at 16 years, as suggested in Table 6. This seems at present the most convenient basis of prediction. Calories per kilogram per unit of height may, however, sometimes be the method of choice. In such case, smoothed figures for the values given in Table 7 may be tentatively used. All these estimates are subject to revision when more data on normal girls of these ages have been accumulated.

SUMMARY

The energy intakes of 52 healthy well-nourished school girls 10 to 17 years of age, some living in their own homes and some in high class institutions, were determined for a period of one week. An analysis of the findings shows:

1. The average daily intakes for the individuals varied greatly, from a minimum of 1649 to a maximum of 2925 calories. These variations bore no close relation to any single one of the common measures of development, age, weight, or height. This is shown by the low coefficients of correlation between total calories and each of these factors: age, $+.09 \pm .093$; weight, $+.21 \pm .090$; height, $+.26 \pm .088$.

The curve of mean intakes by age for this group is slightly above standards for the earlier years, but is markedly below Holt's and somewhat below Hawley's curves at the earlier years. The latter is suggested as a tentative standard to use for prediction of calories by age until more data are available. Age *per se* is, however, a poor basis of prediction and should not be used save when other measures cannot be obtained.

Of the single measures, preference is in favor of height. On this basis some 16 calories per centimeter (or 40 per inch) may give a rough approximation of the needs.

2. The energy intakes of this group were better predicted from a combination of weight and age, or weight and height, than from any single item; age and height gave but little better prediction than height alone. These facts are shown by the correlations: calories per kilogram per age, $-.73 \pm .044$; calories per kilogram per centimeter, $-.80 \pm .034$; and calories per centimeter per age, $-.33 \pm .085$.

Calories per kilogram per centimeter is not a significantly better criterion than calories per kilogram per age, and the latter has the sanction of common usage. The mean intakes per kilogram decrease gradually with age, from 68 calories at 10 years to 37 calories at 16 years. A smoothed curve of calories per kilogram dropping about five calories per year from 10 to 16 years is suggested as a convenient tentative standard.

3. The intakes at different "physiological" ages indicates an increased energy need for growth which is evidenced by the lowered intake of the older girls. Calories per kilogram decreased with "physiological" age while calories per centimeter were quite constant until past the period of rapid growth.

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THE CHILD AS A HOSPITAL PROBLEM[1]

LUCILE STREATER

University of Michigan Hospital, Ann Arbor, Michigan

THE care of normal, healthy, happy children in a home situation is one of the most absorbing endeavors that can engage the interest and efforts of an intelligent adult. It presents a great many complicated, bewildering, and at times dramatic problems. The care of a sick or unfortunate child in a home situation involves a multiplicity of these problems and intensifies the peculiarities of each one. The intelligence and patience, rather than the experience of the person in charge, is probably the greatest factor in assuring ultimate success. The economic resources, number of members in the household, their ages, temperament, and health are often controlling factors.

The responsibility for the care of a child in an institution is no less impressive. In some ways it is more difficult, and although technically the illness may be said to have been uneventful, the experience may not, educationally speaking, be entirely so. In any case, the removal of a child from the maternal environment to a decidedly strange one has definite effect on the reactions of the child who is not acutely ill, or on a very sick child when he begins to respond to treatment and to take notice of his surroundings. Many of the effects of the newness and strangeness are advantageous to him in making a proper adjustment. For instance, the six year old takes an active interest in the casts and traction of his neighbors, or the doctor's dressing cart as it is wheeled from bed to bed. The novelty of eating from a tray often helps the first meal situations. The number of people about and the fact that they are in uniform is more often a matter of interest than it is of fright.

An increased complication of the situation is often attendant on the failure of the parents rather than the child to adjust themselves to the transfer. An apprehensive child is one problem, the mother is another, and the two are better handled separately. Consider the situation when a diabetic child of eight years of age with many definite dislikes for food is about to be admitted to the hospital. The mother is giving a diet

[1] Presented at the fourth annual meeting of the Michigan State Dietetic Association, Flint, Michigan, April 26, 1932.

history in the child's presence. If she is permitted to voice her fears and air her scanty knowledge or false impressions regarding the disease, the result may be disastrous. She may be the type that will say, "You never eat that, do you, Virginia?", and again, in explanation to the dietitian, "Her father just won't either." When the mother leaves the child is naturally lonely. In addition there are new fears to be dispelled, and it is difficult for a child to accept restrictions imposed by an outsider when mother's approval of one's choice of food has been so obvious.

When the child's condition necessitates his treatment outside the home, the character of the institution to which he is removed is of importance. The ideal way to care for children who need medical aid is in an institution planned with their needs definitely in mind with regard to equipment, physical arrangement of the building, and choice of personnel. In a large hospital a separate department should be provided. In any hospital, regardless of size, some arrangements can be made to facilitate the care of children. The physical plant is far less important than personnel. An ingenious person can, however, easily devise means of separating children from adults without rearranging an entire building, and this is an important first step. Decorative effects with an appeal to the child's imagination and love of color, while a very interesting detail, are less important than a good supply of fresh air and sunlight. Furniture and utensils should be durable, suited to the child's needs and of a size that is convenient. The matter of shape, as well as material, is an important consideration in regard to sanitary requirements of utensils. If an odd corner or unused storage room is available it may be transformed into a school or playroom at very little cost. Such a place provides a change of atmosphere with an air of informality for the convalescent child. No matter to what purpose this space is mainly put, it is an excellent center for health education and the giving of diet instruction. If such space is entirely lacking, the dietitian's office equipment may include at least a low table, a blackboard, and a bulletin board.

Some of the problems encountered in the pediatric department of a large hospital where one dietitian is responsible for the food service for one hundred and seventy-five children from infancy through the thirteenth year, are here presented, and some of the methods used are briefly mentioned. They may be of interest to dietitians in hospitals where the child is an uncommon guest, or for purposes of comparison to others whose chief interest is pediatrics.

The very young infant presents only technical problems if placed in an institution planned primarily for the care of adults. The adolescent adapts himself quite readily to an adult environment with only minor difficulties. The child from two to fourteen years of age, however, can play havoc with the routine where previous arrangement has not been made for his treatment and training. Training is emphasized here because it is of such significance in the method and even in the length of time required for treatment.

Regardless of the type of institution or character of the illness, food rapidly becomes an important factor in the child's day, and the dietitian soon makes his acquaintance. To a busy dietitian with adults and occasionally children under her care, the exact selection of foods to serve may be a matter of some concern. Later there may be cause for wonder regarding the method of attacking some behavior problem attendant upon the meal-time period.

As far as the particular problem of meal planning is concerned, it is perhaps most difficult to plan for the child from two to six years of age. Through the second year, children's diets are often quite carefully prescribed by a physician, but after that two tendencies seem equally general. One is to be too concerned about straining foods, scraping beef (or even avoiding meat), toasting bread, or relying on cereals to the exclusion of other important foods. The other is to expect the child to rapidly adapt himself to an adult menu, and at this time to give foods that are both difficult to manipulate and to digest. The manipulation he will manage somehow because he is always resourceful. Muscular coordination is, however, not all that is lacking if a three year old constantly suffers from indigestion and fails to gain on a diet of fried potatoes and coffee cake. The diet must gradually and consistently be expanded to include more variety in selection of foods and in method of preparation. It seems particularly difficult for some adults to comprehend that when a child can eat tender, broiled steak cut in pieces of a size that he can handle, he is not also ready for roast pork. Manipulation may be dependent on training, but proper function of the gastro-intestinal tract is largely dependent on diet and hygiene.

In increasing the diet during the period from two to six years it is important to choose foods for their positive value and to avoid the non-essential ones, as the child's capacity is certain to be somewhat limited. The use of whole grain cereals, plenty of fresh vegetables and fruits, dairy products, eggs, and a moderate amount of meat, preferably the red meats, cannot be stressed too much.

From six to twelve years more liberal increases are made so that at twelve years any healthy child should be getting the same type of food as an adult who chooses his food intelligently. However, the diet should be particularly rich in elements essential for growth.

Because the incidence of malnutrition is very high, it is readily conceivable that a large proportion of hospitalized children will be nutritional problems, regardless of the reason for their admission to the hospital. Each child is an individual problem nutritionally, as he is medically or surgically. The method of approach in regard to food depends first on the child's condition, second on his age and intelligence, third on his attitude as determined by previous experience and training, fourth on his interest in and adaptation to his present environment.

The diet requirements of a child of given age, size, nutritional state, and physical limitations may be specific, but with every child the dietitian is faced with certain general problems. Above all it is important that the child eat. How to secure a desired food intake simply and naturally is at times almost a hopeless problem. The serving of small amounts of food at first and until the child voluntarily asks for more, is always a good plan; thus he develops confidence in his power of accomplishment. Objectionable foods can be avoided for a time, and a number of successful meals to one's credit before undertaking to try new foods is an important step toward success. A large amount of food, or several new foods at a time, calls for more adjustment than some children are able to make. A positive attitude toward new foods may be founded on curiosity and an avowed willingness to try them. The service of simple but attractive food has an effect in stimulating a natural, moderate pleasure in eating. Sometimes the child's interest in food preparation may be stimulated. If so, it will help him to learn to appreciate small services rather than to demand excessive personal attention. It is quite easy to effect this sort of interest with a convalescent child who may visit the kitchens, even at times assisting in preparing some item in his diet, if facilities permit. A bed patient may look forward to this treat and make an especial effort to gain strength. Naturally, having promised this, one must not neglect to carry it out.

A similarity of menu for all types of diets, as far as possible, is of considerable value and not alone from the economic standpoint. The child must know the limitations of his own diet if he is to follow some special régime. If his viewpoint is based on some knowledge of the requirements of children of his own age, he is reassured by several points

of similarity between his trays and those of others, and is likely to accept restrictions more readily. He also learns to respect the peculiar limitations of other children. Thus we may help train him in an important phase of social behavior. For instance, it greatly encourages a diabetic child to know that he may have all the meats and all the vegetables that the others have, that he may have milk, eggs, bacon, most of the fruits, and even something as special as cocoa flavoring or salad dressing. It pleases him to have these when the others do. Thus the emphasis can be placed on amounts rather than kinds of food.

Training in good food habits is a long and often discouraging process. In attempting to initiate such training certain childish traits must be kept in mind, such as curiosity, egotism, and distractibility, which will prove to be of distinct advantage. It is interesting to let a child's curiosity and natural questions regarding food be the beginning of the teaching process. This may precede the formal approach made later when the child has become adjusted to the idea of having a new type of menu or a special diet. The special diet appeals to the child's ego, but must not be over-emphasized to the extent that other children feel they are not getting their full share of attention.

The apprehensive, homesick child adapts himself astonishingly soon to the hospital community. Normal children are keenly observant and learn quickly some of the things taught to the patient in the next bed. Thus much propaganda for the normal diet can be spread. There is, however, the extroversive type of child who is so stimulated by the activity about him that he fails to concentrate sufficiently on his own affairs. A certain amount of distraction may be an excellent thing for him at times, though at meal time it may be necessary to feed him alone or before the other children are served.

Bedside teaching is of course the usual thing. Classes for convalescent children may be possible and are advisable if contagion does not have to be considered. Some of the best features of the group method are available for bed patients if they are situated in wards. A single child alone in a room is a very different problem from one who may have from one to twenty room-mates.

Above all one must bear in mind that frequent, brief but positive visits with the child are more important than long sessions. Constant, interesting repetition is essential in actually carrying a point. To question a child daily regarding which foods on his tray contain important amounts of iron trains memory and arouses a feeling of anticipation. The length

of time for hospitalization and the condition of the patient determines the scope of the material taught. One or two points may be all that they can grasp, but these should be definite and constructive.

An interesting check on the success of one's teaching is a child's newly acquired ability to make choices. To use an actual example: a child on a high-vitamin and high-iron diet was to plan a meal, having a choice of ice cream and apricot jelly for dessert. He had learned to be very honest about his capacity. He also had learned that ice cream would not hurt him, but that it counted very little in contributing toward an iron supply. To have an ingenious child suggest apricot sauce on the ice cream and a fruit juice beverage rather than additional milk is a very satisfying bit of reasoning to have stimulated. It would defeat one's purpose to refuse. Allowing the child to take a part in menu planning as contrasted with soliciting him regarding likes and dislikes for food is an effective method of approaching a difficult problem.

The type of material that is useful in teaching bed patients is rather limited. Appeal to the eye is important. Pictorial material is valuable particularly if it is the type the children, themselves, manipulate. To color, cut, paste into a scrap book and label pictures of foods suitable for himself is undoubtedly the activity that is most lasting in effect. This, for the diabetic child especially, in addition to handling food, makes a good foundation for a lasting impression. Poster material must be very carefully selected and then used cautiously. The keeping of health records and weight charts is interesting and effective. Another excellent scheme for older children is making health and diet score cards when entering, and another before leaving, for purposes of comparison.

There is no doubt that the personalities of the people that are to influence the child on matters relating to food may make or mar a situation. Cooks or serving maids not interested in children are not only useless, but definitely disadvantageous. Nurses must be interested, resourceful, and observing, whether or not they are experienced with children. The mob spirit in a ward depends largely on the response of the children to the attending adults; this spirit can be made an asset or a liability, and can be altered almost instantly by a simple incident or personality.

Probably the most remarkable feature observed in working with children is the rapidity with which the physical condition and mental state can change. The dietitian must be alert. Menus cannot be planned intelligently unless it is known how previous ones have been

received. If there is trouble it is sometimes difficult to trace the source. Second-hand information is of little value and often definitely misleading. The sudden poor appetite of a former prize patient may be caused by an acute infection or indicate a hunger strike. The subject of hunger strikes and chronic anorexia, requiring specific psychiatric and medical attention, do not come within the scope of this paper.

Careful analysis of all untoward situations as they arise will often yield valuable information and forestall future difficulties. The accessibility of the attending physician is of the utmost importance. Cooperation between, and a mutual understanding of motives by the doctor, dietitian and nurse are fundamental, if success is to be attained in the momentous business of feeding and training children.

MODERNIZING THE DIETARY DEPARTMENT

CLARA MATTHES AND HELEN SEAGO

John Sealy Hospital, Galveston, Texas

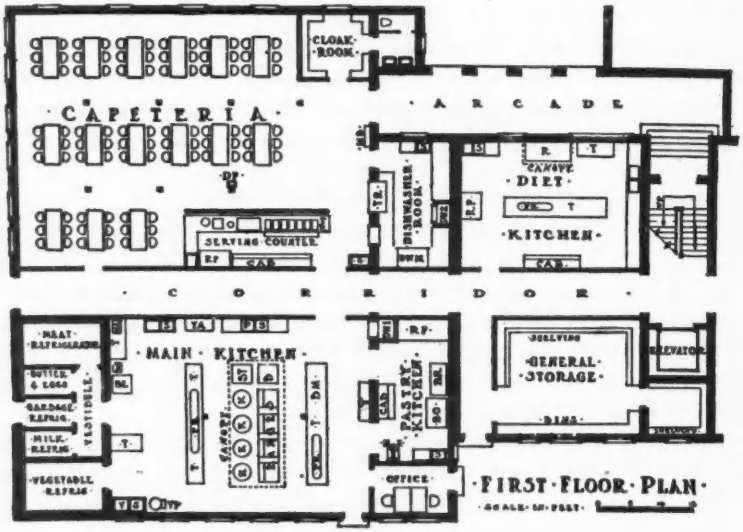
THE increasing number of patients requiring hospital care and the consequent enlargement of the staff of employees overtaxed the only kitchen of the John Sealy Hospital, which occupied a room forty by forty-two feet, including store rooms, office, and cold storage. This space was entirely inadequate for the preparation of fifteen hundred meals daily for the private and ward patients, interns, supervisors, nurses, and employees, and special diets in addition. Space to enlarge the kitchen and make ample dining room facilities for the personnel of the hospital was provided by the wrecking of the old power plant and laundry, which had been replaced with a new unit.

The new dietary unit erected in this space consists of a main kitchen, pastry kitchen, special diet kitchen, cafeteria, store room, and dietitian's office on one floor, with dining rooms for the directress of nursing, interns, and supervisors. The accompanying floor plan shows the details of the arrangements on the lower floor. It is our purpose to explain the work carried on in each of these units in turn.

The main kitchen is thirty by sixty-six feet, which includes the space used for cold storage and the pastry kitchen. It has a tile floor sloped to three floor drains which permit easy and thorough cleaning, and sky lights in the ceiling which allow light and ventilation. The food preparation space is directly in front of the cold storage. Equipment for the preparation of vegetables includes a large monel metal double compartment sink, electric potato peeler, vegetable cuber, and steel work table. The meat unit consists of a meat block, meat slicing machine, electric meat grinder, and small monel metal sink and table. The food passes from these two units to the steel topped cook's table, and from there to the cooking equipment, which consists of four forty-gallon aluminum steamers, four ranges, and a broiler. The ranges, one of which has a fry top, are separated by spreader plates. A large canopy covering the ranges and steamers collects and carries off the heat and odors from the cooking. The use of pot and pastry racks does away with a dark pantry and keeps all utensils in the open. The pastry kitchen opens directly off

the main kitchen. It contains a six compartment refrigerator, eighty quart mixer, pastry oven of forty-five pie capacity, work table, pastry rack, supply cabinet, and bread slicer placed on top of a bread cabinet, which has a capacity of seventy-two loaves and twenty tin bread boxes. All desserts and salads for both patients and employees are made in this kitchen.

Care was exercised in planning the kitchen so that food should travel in a straight line from the cold storage to the preparation space, on to the cooking equipment, then to the bain marie, and there loaded on food



carts and conveyors. It is then sent to the serving kitchens in the various wards from which it is served immediately to the patients. Breakfast is served to the patients at 7:15 A.M., dinner at 12:15 P.M., and supper at 5:15 P.M. In the employees dining room the meals, which are the same as those served in the public wards, are served at 6:30 A.M. 12:00 noon, and 5:00 P.M.

The personnel in the main kitchen consists of one dietitian, one chef, one vegetable cook, two vegetable helpers, one pot washer, and one cleaner.

Four menus are prepared for the following groups: nurses and interns; private patients; private ward patients; and public wards. The menu for the public wards and the employees is the same.

Food for the private patients and the special diets are prepared in the special diet kitchen. This diet kitchen also supplies the nourishments to all ward serving kitchens each morning upon approved requisitions. Food used by the special diet kitchen is brought from the main cold storage and store room at the beginning of each day and placed in the refrigerator. The personnel here consists of one dietitian, one special diet nurse, one nourishment nurse, one salad nurse, and one cook. While on duty for six weeks in this kitchen, these nurses receive special training, which gives them a comprehensive understanding of special and therapeutic diets. The special diet nurse plans and prepares the special diets and places them in the special diet boxes to be sent to the ward serving kitchens. A copy of the day's menu is placed in the box with the food. The nurse on the floor sees that the food for each special diet is served each meal. The boxes are cleaned and returned to the diet kitchen for refilling by 8:30 the following morning. There is a daily average of thirty special diets. The nourishment nurse, in addition to attending to nourishments, fills ward supply orders, prepares custards, baked apples, and similar special foods. The salad nurse prepares the salads for private patients, pay wards, and tubercular patients.

The menus, which are planned for the private patients by the dietitian a few days in advance, are taken care of by the cook who also assists in the preparation of vegetables for the special diets. The food is conveyed to the private floors in aluminum rack containers and served by maids, supervised by the nurses. Eggs and similar foods are raw when sent to the serving kitchen and cooked at the time of serving. Private patients are allowed special orders without additional charge, but these orders must be in the special diet kitchen by 11 A.M. The hospital at present has only thirty-one private rooms, but plans are being developed for the addition of eleven more.

The menus for the Children's Hospital are planned by the dietitian. The raw food is sent each day from the storage in the main kitchen to the serving kitchen of this hospital and prepared by their cook. This hospital contains sixty beds.

The cafeteria is a room thirty-seven by forty-five feet with a seating capacity of ninety-six people. A cloak room and lavatory for the nurses are near the outside entrance. The cafeteria counter, made of monel metal, is located on the side of the cafeteria nearest the kitchen so that food is transported only a short distance across the intervening corridor and enters the cafeteria immediately back of the serving counter. This counter is twenty-two feet long and contains two meat and eight food

compartments, a cold pan for salads and desserts, ice cream cabinet, electric toaster, and a coffee urn which faces the cafeteria so that the nurses can pour their own coffee. Warming compartments are provided for the dishes, and a two compartment refrigerator, cabinet, cupboard, and sink for the washing of glasses and silverware, complete the equipment behind the serving counter. The water fountain, connected with the cold storage, is near the end of the serving counter, and beside it there is a rack for glasses. The tables in the cafeteria have an easily cleaned composition top. There are napkin boxes on either side of the entrance door where each nurse has an individual compartment. The cafeteria serves about one hundred and fifty student nurses, special duty nurses, and office employees, in two sections. Breakfast is served at 6:30 to 6:45 A.M. and 7:00 to 7:30 P.M. (for night nurses); dinner at 12:00 to 12:15 P.M. and 12:30 to 12:45 P.M.; and supper at 5:00 to 5:15 P.M. and 5:30 to 5:45 P.M. The personnel of the cafeteria includes one head waitress, three waitresses, one colored maid, and two bus boys.

The dishwashing room is adjacent to the cafeteria and contains a monel metal dish washer with a capacity of forty-six hundred dishes an hour. All of the tables for handling the dishes are of monel metal. The dishwashing machine is under a canopy with forced draft, which collects and carries away the vapor. Soiled dishes from the cafeteria are brought to the dishwashing room on a dish cart and from the graduate nurses' dining room by a dumb waiter. The clean dishes are returned in the same manner.

The graduate nurses' dining room consists of a dining room for the directress of nursing and her staff, an interns' dining room, and a supervisors' dining room equipped with eleven tables, each seating four people. The serving kitchen for these is equipped with a four compartment refrigerator, an icebox for crushed ice, ice cream cabinet, steam table containing one meat pan and four food compartments, coffee urn, built-in cupboard, cabinet for dishes, and porcelain sink. The food is served in courses by the waitresses. The serving hours in this dining room are so arranged that part of the personnel from the cafeteria is available to help with the serving.

To preserve all the food needed in the hospital a thorough system of refrigeration is necessary. This is comprised of the five cold storage rooms opening off the main kitchen and used for meat, milk, butter and eggs, vegetables, and garbage. The plant is of three and one-half tons refrigeration capacity. The cold storage rooms, connected by a refrigerated vestibule, have shelves to fit their individual needs. The meat

cooler has racks on which to hang the carcasses. Cleaning the cooler is an easy task since all floors are of tile, and the racks and shelves keep all stored articles off the floor. The garbage cold storage has an outside entrance. In order to prevent anyone entering the remaining cold storage rooms by this means the inside handle of the garbage cold storage is so constructed that the door can not be opened from the inside. In case anyone is accidentally locked in this room an alarm can be given by means of an electric buzzer that is connected with the kitchen. This system of locks prevents thievery. Garbage is collected from the main kitchen, diet kitchen, and dishwashing room as often as necessary and kept in the garbage cold storage until it is collected each morning by the City Health Department. Waste fat is also stored in this space until enough has accumulated to make soap.

The store room, which is large enough to permit quantity buying, is across the corridor from the dietitian's office. Adequate shelving space is provided for small packages and broken cases, while racks on the floor permit the storage of from two hundred to two hundred and fifty cases of goods. Zinc lined bins are provided for such staples as sugar, flour, beans, and rice. A full time employee is in charge of the store room. In addition to keeping his store room clean and in order, he has charge of distributing all food, such as milk, cream, butter and eggs to all the kitchens and dining rooms, fills the requisitions for raw food for the main and diet kitchens, and distributes the meals to the wards on the food conveyors. At the back of the store room is the stock dish room. Here stock dishes can be conveniently and centrally stored, and replacements of broken dishes made.

There are twenty-nine employees in the dietary department whose work is supervised by two dietitians. The dietitians' office is adjacent to the kitchen and is so located that the main kitchen and supply room can be controlled from it. The chief dietitian is responsible for the purchase of all the food and does this upon a strictly competitive basis. Lists of groceries are made out regularly and submitted to the wholesale grocers for prices. Certain standards are adhered to in the preparation of these lists, but the grocer is given the opportunity of bidding on an alternate and submitting a sample. Trips are made regularly to the packing houses and the meat inspected before purchasing. In the fall of the year large orders are placed for canned goods as it has been found that the price at this time of year is lower.

With the construction of these new facilities and the reorganization of the dietary department, the major defects of the department have been abolished and this hospital unit fulfils its part in the care of patients.

THE CHANGING PROBLEMS OF DIETETICS[1]

REGINALD FITZ, M.D.

From the Medical Clinic of the Peter Bent Brigham Hospital, Boston

IN THE fall of 1909, when I began my interneship at the Massachusetts General Hospital, dietetics was very much in its infancy. At that period house-officers and nurses in training acquired but little knowledge in regard to food and food values. Many of our patients with chronic diseases like nephritis, pernicious anemia or diabetes, which are now appreciably amenable to intelligent dietetic treatment, used to enter the hospital seemingly in comparatively good condition and then before our eyes would go down hill with disheartening rapidity, dying shortly after a demoralizing series of gastrointestinal catastrophes. There was a typhoid epidemic during the summer months and Dr. F. C. Shattuck's enteric diet was served right and left. This diet everyone came to know well—and a good one it was to know—but otherwise about all I can remember of the diets of those days are vague names like house diet, soft solid diet, liquid diet or milk diet, and I can still visualize the diabetic diet which consisted mainly of a sort of glorified club sandwich which was parcelled out indiscriminately and with considerable mortality.

THE DIET KITCHEN AND CALCULATED DIETS

It was not until nearly 1915 that trained dietitians, modern diet kitchens, and calculated diets of various sorts came into vogue. In 1919 we read (1): "The ideal arrangement, and the one which is being rapidly adopted by the best hospitals, is to organize a special metabolic ward with a separate diet kitchen in as convenient proximity to it as possible. The head of the kitchen may be either a specially qualified nurse or a trained dietitian who is not a nurse. Her time is best left free for duties of supervision. The physician has merely to order a diet in terms of protein, carbohydrate, and calories. The nurse then translates these figures into the actual foodstuffs, superintends the cooking, and is responsible for the accurate recording of everything pertaining to the diet. She maintains a sympathetic acquaintance with all the patients,

[1] Presented before the Massachusetts Dietetic Association, March 8, 1932.

takes care that the selection and preparation of food suits their tastes as well as possible, and by smoothing small difficulties contributes greatly to lighten the lot of the patient and the labor of the physician." The development of the dietitian along these lines, combined with medical investigation, has made hospitals infinitely safer and more comfortable places for sick folk than they were a few years ago.

The remarkable change in the hospital mortality of diabetes and pernicious anemia illustrates sufficiently well what striking improvements have been made in the treatment of two heretofore hopeless chronic diseases, and surely the advancing knowledge of dietetics has played a definite part in this change. Even the mortality from chronic nephritis has been diminished a little, a hopeful fact to remember. The mortality from typhoid has remained about as it was, but the disease has become

TABLE 1

The mortality from pernicious anemia, diabetes, chronic nephritis and typhoid fever in the Medical Wards of the Massachusetts General Hospital in 1909–1910, and in 1929–1930

(From data published in Massachusetts General Hospital Reports)

	1909–1910			1929–1930		
	Total cases	Deaths	Per cent deaths	Total cases	Deaths	Per cent deaths
Diabetes mellitus	42	7	17	167	6	4
Pernicious anemia	41	8	19	65	4	6
Chronic nephritis	114	35	31	111	28	25
Typhoid	208	18	9	133	17	13

To obtain the figures listed in the 1929–1930 series of typhoid cases it was necessary to go back ten years in the Hospital records.

a rarity and the modern diet, I believe, allows typhoid patients to leave the hospital in better condition thus making convalescence much shorter.

THE INCREASING DEMANDS ON THE DIETITIAN

Doctors have been quick to see the possibilities of the modern dietitian and her knowledge and have been inclined to ask her more and more to perform the impossible. It is reasonable for them to expect her to fill diet prescriptions, accurately, inexpensively, and tastefully. On the other hand, too many demands for special diets is time-consuming for her, often wasteful of the hospital's money and a practice on the part of doctors easily capable of being carried to absurd proportions. At the suggestion of Dr. Henry A. Christian, Mrs. Thelma Tubbs Currier began an interesting experiment in the Peter Bent Brigham Hospital a few

years ago which could well be, and has been duplicated elsewhere. The number of special diets served each year was increasing to an inconvenient degree; to offset this it was decided to do away with all unnecessary weighing and measuring. Special diets as far as possible were constructed from the house diet sent to the wards for general distribution and all unnecessary manipulations were omitted. The result of this experiment has been easily measurable. Much effort and considerable money have been saved, the nurses have learned more about the food

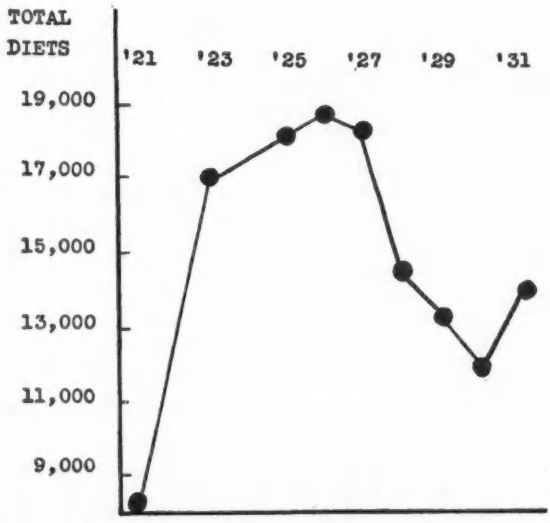


FIG. 1. AN ATTEMPT TO SIMPLIFY THE WORK OF THE DIET KITCHEN AT THE PETER BENT BRIGHAM HOSPITAL

preferences of sick people, and as far as one can judge, the results of diet therapy have been no less satisfactory than a few years ago.

After all, there are comparatively few diets that need to be accurately measured and weighed, and no matter how carefully such diets are constructed they are notably inaccurate to anyone with experience in metabolism or chemistry. Diets which are not analyzed chemically at each serving are of *qualitative* value only, they are not *quantitative* diets. It should be the aim of the dietitian to make all special diets palatable, cheap, and of so simple a nature that they can be prepared easily at home by any intelligent person. They should be made from the foodstuffs commonly used in everyday life, and without unnecessary effort. The

plan suggested by Dr. Christian and Mrs. Currier is of great importance for this purpose and much more practicable for good dietetic work in most hospitals than the over-development of a special diet service with its subtle air of mystery and pseudo-accuracy.

THE DIETITIAN AS A TEACHER

The dietitian is now doing a good deal of missionary work and there still remains much for her to do. She must teach dietetics as well as carry out the practical details of her work. Not only must she be prepared to educate patients in a working knowledge of foods and food values but also must she educate doctors. The modern hospital offers an excellent opportunity for such work. The various Boston hospitals are utilizing their dietitians as teachers in several original ways. Miss Frances Stern at the Boston Dispensary, for instance, has been interested particularly in teaching foreigners how to eat. Her work in diabetes is especially successful; she has devised practical methods for teaching foreign diabetic patients—and many cannot speak or understand English—how to prepare measured diets from the kinds of food to which they are accustomed and which they like. In Dr. Joslin's Clinic at the Deaconess Hospital, clinical, laboratory, and dietetic demonstrations are conducted which are helpful to doctors, patients, and dietitians alike. At the Peter Bent Brigham Hospital Out-Door Department we have been interested for many years in the development of various "classes" in which groups of patients with similar diseases are assembled and taught how to care for themselves. The dietitian plays an important part in the success of these classes, teaching fat people how to get thin, thin people how to get fat, and patient with arthritis, ulcer, heart or kidney disease, diabetes, or anemia, how to eat. Teaching of this sort is bound to become increasingly important as hospitals become more like health centres for their various communities, rather than nursing homes. It requires considerable ingenuity and enthusiasm to make such teaching of interest to house-officers and visiting staff, but to arouse the proper kind of interest in dietetics is a goal worth striving for. Doctors certainly need education on matters pertaining to foods fully as much as do their patients.

THE INCREASING OPPORTUNITIES IN DIETETICS

I have been interested in watching the widening sphere of dietetics as time has passed. There is now opportunity for well trained dietitians in many other fields than hospital work. Modern schools and colleges,

for example, are trying to supply their pupils with properly balanced rations of well-cooked food at a reasonable per capita per diem cost, accomplished under the guidance of a dietitian. Underweight boys and girls are now given individual dietetic supervision. Methods for the most advantageous way of feeding college athletes are being studied. There is increasing opportunity for the dietitian in public health work, in the field of commerce, in the field of food analysis and in the field of research.

Miss Mary A. Foley began an interesting experiment at The Mayo Clinic about ten years ago which is full of possibilities. She started a restaurant in which ambulatory patients who needed special diets could eat together, being served individually prepared diets filled according to prescriptions ordered by their doctors. A few years ago Mrs. Quindara Oliver Dodge, while dietitian for a large lunch room in Boston, was able to supply accurately prepared meals daily to several of my patients. Those with opportunities such as hers can quickly build up a following among business men who need diets of one sort or another, and who would rather buy their food than bring it from home or take the chance of guessing what they should eat in quite haphazard fashion.

The consultant dietitian is working successfully in a few localities, holding office hours for patients referred to her by doctors. She talks to these patients, outlines diets for them in accordance with their prescriptions and even goes to their homes to give practical demonstrations in the technique of measuring and preparing meals. To what extent such opportunities can be developed is somewhat problematical. My own impression is that the bulk of such work will fall to dietitians interested in the social service aspect of their profession, and that comparatively few will be able to attain any degree of fame or success in private practice.

THE NEED OF INTELLIGENT SKEPTICISM AMONG DIETITIANS

Two years ago Dr. Christian (2) pointed out how gullible doctors may be in regard to seizing upon and devouring the latest medical fad. He spoke of the need among doctors for the development of a properly critical attitude and described some of the great opportunities at hand that exist for the advancement of medical knowledge by common-sense, straightforward use of one's inherent powers of observation, analysis and deduction.

The same line of argument can well be applied to dietitians at the present time. With the radio, the Sunday supplement, and other methods of advertising, it is possible for the public to be seriously misled

in regard to how and what to eat, especially since there has developed so general an interest in these matters. It behooves the dietitian therefore to develop an intelligent skepticism, and to restrain her patients or medical colleagues from unbalanced, uncritical adoption of the latest fashion in foods and diets. Dietetics, like medicine, can best be advanced by the application of one's inherent process of observation, analysis and deduction; novelties in diets and dietetics on the whole are likely to be short-lived and evanescent, requiring a great deal of careful control before they can be accepted as sound practice.

CONCLUSION

The science of dietetics has made remarkable progress in the last twenty years and there is abundant opportunity for interesting and original work in many fields of dietetics for persons with proper training. The hospital and administrative side of dietetics has become fairly standardized in many institutions through the establishment of diet kitchens and prescription diets. There may have developed a tendency to over-emphasize the value of weighed and measured diets as an instrument of treatment for disease. The need of work in other fields than hospitals has become recognized and there are many ways of applying dietetics in school, college, commercial or research work which were hitherto unthought of. Diets, foods and food values have come to occupy an important place in the minds of the general public. Both doctors and dietitians need to develop a critical attitude toward novelties in diets and dietetics, remembering that certain dietetic fads formulated without the most careful control are likely to be short-lived and of little permanent value. Dietetics can be developed most rationally by the cultivation of a spirit of intelligent skepticism.

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QUALITY STUDIES OF THERAPEUTIC DIETS: III. THE REDUCTION DIET

ELIZABETH HAYWARD AND DOROTHY S. WALLER

A COMMITTEE REPORT[1]

The high and rapidly increasing percentage of overweight makes the subject of obesity an important one from the standpoint of both clinical and preventive medicine. The fact that a considerable number of diets have appeared, which are extreme in their restriction, makes the subject of unusual interest to the dietitian. These diets range from the popular variety to those carrying impressive professional sponsorship. It seemed important, therefore, to carry out the following procedures:

(1) A survey of the bases used by representative clinicians in prescribing reduction diets.

(2) A calculated analysis of the reduction diets used in leading hospitals.

Replies by physicians to questionnaires. The questionnaire asked for information relative to the standards used in prescribing the intake of calories, proteins, the carbohydrate/fat ratio, minerals, vitamins, residue, fluid and salt; whether emphasis was placed on the inclusion of any particular foods, and what extra-dietary measures were advised.

About one-half the physicians replying indicated the use of a basal metabolism determination in establishing the caloric value of the diet to be fed. The total energy requirement was estimated in a wide variety of ways, from various percentage increases above the basal calorie level, Du Bois prediction tables, and trial and error methods. The same variation was noted in method of establishing the caloric value of the diets, which ranged from 600 to 1700 calories, with a conclusive mean of 1200 calories.

The level of protein advised ranged from one to 2.5 grams per kilogram of body weight. In most cases the weight figure used was the statistical average for age and height. In one case it was the mean of the average, or ideal, and the actual weight.

[1] Conducted by Miss Hayward's committee as part of the Diet Therapy Section's program for 1930–31.

A number of physicians did not consider the carbohydrate to fat ratio, though a majority indicated the use of ratios varying from 2.5:1, to 4:1, and that they definitely avoid ketosis.

Calcium, phosphorus and iron intakes were advised which equal those of the normal diet. Several replies stressed an increased mineral supply during periods of weight reduction.

A liberal intake of vitamin-containing foods was generally advised, though a few replies did not consider this question important. Vitamin A received no particular emphasis.

A high residue diet was generally advised.

A few replies indicated that fluid restriction was considered a useful procedure, though the majority employed it only when cardiac or renal involvement was present.

Several replies stressed the inclusion of particular foods to assure an adequate mineral supply, such as one pint of milk, one egg and one or two green vegetables daily. A few mentioned the importance of including small amounts of the high vitamin fats, such as cream, butter, milk, egg yolk and cod liver oil. A few used no fat foods at all.

The additional comments included: emphasis on a moderate amount of exercise; the use of thyroid therapy if the basal metabolism were minus 5 per cent or lower; the search for endocrine dysfunction; caution against acidosis; cold baths, sun baths and cooler living conditions.

Calculation of diets served in hospitals. Dietitians in hospitals throughout the country were asked for information concerning the planning and calculating of reduction diets. They were also asked to send in a week's calculated menus (2). The following material has been summarized from the replies and diets submitted.

The majority of reduction diets served in hospitals are measured rather than weighed. The amount of fruit and vegetable included varied from four to nine servings daily, with one hospital allowing the unlimited use of low carbohydrate vegetables, in addition to three servings of fruit daily. The majority of the diets included two glasses of skimmed milk and one serving of lean meat daily. A few included, in addition, two eggs daily. In one hospital mineral oil was served with each meal.

The menus submitted have been calculated to comparable weights of serving portions. There exists undoubtedly a wide variation between these portions, as served on measured diets in various institutions, but for purposes of comparison this has been disregarded. The following tabular summary shows the range of protein, calcium, phosphorus and iron, fiber and carbohydrate/fat ratios, observed in the calculated diets.

These tabulations present a number of interesting points. The protein minimum of the 600 to 1000 calorie diets (Eastern) is very close to the Sherman (1) minimum of 44 grams for the 70 kilogram adult, or $\frac{2}{3}$ gram per kilogram of body weight. These diets uniformly included at least one, and occasionally two servings daily of foods yielding protein of high nutritive value, such as meat and milk. It is therefore probable that the majority of these diets meet the adult's requirement for quantity and quality of protein.

The calcium average for each of the groups noted above is also very near the Sherman standard of 0.68 gram daily. The minimum values for

TABLE 1

Nutritive yields of reduction diets with different caloric values

GROUP	PROTEIN (GRAMS)		CALCIUM (GRAMS)			PHOSPHORUS (GRAMS)			IRON (MGM.)			FIBER (AVERAGE GRAMS)	CHO/FAT RATIO	
	Minimum	Maximum	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average		Minimum	Maximum
I. 1000 calorie diets—Western hospitals.*	50	70	0.89	1.23	1.08	0.98	1.4	1.17	9.9	19.5	14.7	7.2	4:1	5:1
II. 600 to 1000 calorie diets—Eastern hospitals.....	40	80	0.28	1.03	0.60	0.63	1.12	0.87	9.1	12.8	10.7	9.0	1:1	5:1
III. 1000 to 1250 calorie diets—Eastern hospitals.....	60	80	0.26	1.09	0.73	0.63	1.35	1.13	11.5	15.3	13.5	9.0	2:1	4:1
IV. 1250 to 1500 calorie diets—Eastern hospitals.....	80 ± 5 gms.		0.75	1.84	0.79	±Av.	±Av.	1.26	13.8	15.6	14.8	9.0	2:1	3:1

* Smaller variations in the protein and mineral values (as the caloric value increased from 400 to 1200) were observed in the diets received from Western hospitals. The 1000 calorie diets therefore have been given as typical.

the second and third groups, however, are seriously low. These low calcium totals were observed in diets where milk had not been used. The same point is to be noted in the phosphorus figures of the first and third diet groups. The average phosphorus contents, 1.17 and 1.13 grams daily, are 10 to 15 per cent below the Sherman standard. The minimum values in the first group, however, are barely above, and in the third group definitely below, the Sherman minimum of 0.88 gram daily.

The minimum and average amount of iron yielded by the 600 to 1000 calorie diets are barely up to the Sherman minimum of 10 milligrams daily. The other three groups are quite satisfactorily compared with the recommended standard of 15 milligrams daily.

The diets studied were all high in fiber, the lowest figure for any menu observed being 2.8 grams on a 400 calorie diet. For the same reason (the liberal use of fruits and vegetables) they were all preponderantly basic in their reaction, yielding from two to three times as much base-forming as acid-forming ash. Though there is no quantitative method of noting vitamin requirement, and though the vitamin values are subject to extensive losses in preparation and storage, it is probable that the generous amounts of vegetables and fruits provide adequate amounts of the vitamin B complex, vitamin C, and a fair amount of vitamin A.

We have been primarily interested in deriving from this information recommendations which would safeguard the reduction diet at its weaker nutritional points. It has seemed simpler to present these recommendations in the form of a diet which present knowledge leads us to believe is adequate. As the average caloric value of the diets used by the physicians consulted was 1200 calories, that figure has been used in the diet shown in table 2.

It will be noted that this diet supplies approximately one gram of protein per kilogram of usual adult weight, the minimum standard recommended in the physicians' replies quoted above. It supplies amounts of calcium, phosphorus, and iron which compare satisfactorily with the accepted standards. The fat is unusually high and the carbohydrate to fat ratio consequently low, but the vitamin A supply is, by the inclusion of two glasses of unskimmed milk, nearly one ounce of butter and two egg yolks, adequately provided for. Adequacy of the vitamin B complex and of vitamin C is assured by the inclusion of four servings of vegetable, two of which are uncooked, and three servings of fruit. The diet yields a preponderance of basic ash and a slightly higher than average fiber content. The nutritional adequacy of this reduction diet has been assured by the daily inclusion of:

Milk, 1 pint, for calcium, vitamin A, and protein quality.
Vegetables and fruit, 6 servings, for vitamins, minerals (especially iron) and satiety.
Lean meat, 1 serving, for protein quality and satiety.
Eggs, 1 serving, for protein quality, vitamin A, iron and satiety.
Butter, not less than ½ oz., for vitamin A, satiety and palatability.

Other choices of meat, vegetable, fruit or bread could change markedly the iron, vitamin, acid/base reaction, and fiber values of the diet. They would change only slightly the calcium, more than half of which is supplied by the milk. It might be suggested that skimmed milk could well be substituted for whole milk with a consequent saving of 128 calories,

TABLE 2

FOOD	MEASURE	WT.	PRO.	FAT	CHO.	CAL.	Ca	P	Fe	VITAMINS			EXCESS		
										A	B	C	Acid	Base	Fiber
Breakfast															
			grams	*grams*	*grams*		*grams*	*grams*	*mgm.*						*grams*
Grapefruit*	½	100	0.5	0.2	9.8	43	0.021	0.020	0.27	+	++	+++		5.2	0.3
Cereal, cornflakes	½ cup	15	1.2	0.1	13.0	58	0.003	0.029	0.40				0.8		
Toast, Graham	1 slice	30	2.7	0.5	15.3	77	0.015	0.065	0.70	+	++	−	2.0		0.3
Milk, whole	1 glass	200	6.6	8.0	10.0	138	0.240	0.186	0.48	+++	++	− to +		3.6	
Cream, 20%	1 T.	15	0.4	3.0	0.6	31	0.014	0.013	0.03	+++	++	− to +		0.1	
Butter	½ square	5		4.2		38		0.001	0.01	+++	−	−			
Lunch or supper															
Eggs **	2	100	13.4	10.5		148	0.067	0.180	2.52	+++	+ to ++	−?	11.1		
Lettuce salad‡	¼-4″ head	100	1.2	0.2	2.3	16	0.043	0.042	0.42	+ to ++	++	+++		7.4	0.6
Carrots	¼ cup	50	0.6	0.1	4.1	20	0.028	0.023	0.32	+++	++	+ to ++		5.4	0.5
Strawberries	⅔ cup	100	0.8	0.6	6.9	36	0.041	0.028	0.68	+	+	+++			1.2
Bread, Graham	½ slice	15	1.3	0.2	7.6	38	0.007	0.032	0.35	+	++	−	1.0		0.1
Butter ***	1 square	10	0.1	8.5		77	0.001	0.002	0.02	+++	−	−			
Milk, whole	1 glass	200	6.6	8.0	10.0	138	0.240	0.186	0.48	+++	++	− to +		3.6	
Dinner															
Beef, very lean†	4″ x 4″ ½″	100	22.4	2.9		116	0.013	0.241	4.10	+	++	− to +	11.5		
String beans	⅔ cup	100	2.4	0.2	6.3	37	0.046	0.052	0.98	++	++	++		5.4	1.4
Tomato salad‡															
Lettuce	2 leaves	30	0.4	0.1	0.7	5	0.013	0.013	0.13	+ to ++	++	+++		2.2	0.2
Tomato	1 med.	100	1.0	0.3	3.4	20	0.011	0.026	0.44	++	++	+++		5.6	0.6
Peaches	1 med.	100	0.5	0.1	11.4	48	0.016	0.024	0.33	+ to ++	+ to ++	++		5.0	0.6
Bread, Graham	½ slice	15	1.3	0.2	7.6	38	0.007	0.032	0.35	+	++	−	1.0		0.1
Butter ***	1 square	10	0.1	8.5		77	0.001	0.002	0.02	+++	−	−			
			63.5	56.4	109.0	1199	0.827	1.197	13.03				27.4	43.5	5.9

* Or other 10 per cent fruit. The fruit and vegetables noted are understood to be examples of possible choices from the lists of these foods classified according to the usual carbohydrate grouping of 5, 10, 15 and 20 per cent.

** Or 2 oz. lean meat or cottage cheese.

*** For bread and preparation of food in this meal.

† Or other lean meat.

‡ With mineral oil dressing.

and no loss of calcium. The only sacrifice would be in the vitamin A value of the diet, the importance of which in reduction programs has been emphasized by Fishbein (3). The omission of one glass of milk, though it would leave a nearly optimum calcium supply (0.587 gm.), would reduce the phosphorus to a level (1.015 gms.) only 15 per cent above the Sherman minimum of 0.88 gms. That this 1200 calorie level is a satisfactory one for the adult whose obesity does not constitute an acute physical emergency, is evidenced by the clinicians' replies summarized above. We wish to emphasize that this caloric restriction does not preclude diets that conform to optimal nutritional standards.

CONCLUSIONS

1. A summary of replies to questionnaires sent to physicians interested in obesity and its correction, is presented.
2. The calculated nutritional values of reduction diets as served in a geographically representative group of hospitals is summarized, showing that the reduction diet may be barely adequate in protein and iron, and seriously inadequate in calcium and phosphorus.
3. A reduction diet is presented which supplies:
    a. Protein, 1 gram per kilogram of average adult weight, the quality of which is assured by the daily inclusion of milk, meat, and frequently eggs.
    b. Calcium, phosphorus, iron and vitamins in satisfactory amounts.

ACKNOWLEDGMENT

The committee wishes to express their appreciation to the physicians and dietitians whose coöperation made this study possible.

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(3) FISHBEIN, M.: Your Weight and How to Control It, New York: Doran and Company.

MUFFINS AND CAKES WITHOUT WHEAT

ADA M. FIELD, BERNICE GOLD AND HELEN LUNDGREN

Laboratory of Home Economics, University of California at Los Angeles

THE growing recognition that food allergy is not so rare as was once thought and that wheat is one of the most frequent causes of disturbance (8, 9) has directed increased attention to other flours. Numerous recipes for substitute flours were developed in 1917 and 1918, but most of these call for some wheat, while allergy usually requires complete elimination of the offending food. Therefore a study was made of some wholly wheatless recipes suitable for home baking. Since eggs and milk, however excellent in themselves, are also among the most frequent allergens (8), we aimed at eliminating the one or the other in most recipes. Plain muffins, with and without eggs, and sponge cakes were chosen for experimentation.

EQUIPMENT AND METHODS

The flours used were of entire grain and finely ground.[1] The liquid was fresh whole milk, the fat "Crisco," and the leavening an S.A.S.—phosphate baking powder. Muffin pans were of block tin, 1 and $\frac{1}{4}$ inches deep, and held 100 ml. each. For cakes, rectangular tin bread pans, 2 inches deep, were used. Baking was done in gas ovens with automatic control, checked by Taylor thermometers. The methods of mixing and handling were those of Halliday and Noble, *Hows and Whys of Cooking*, pp. 50 to 51 and 101 to 102. Raw materials and finished products were weighed on trip scales.

Weighing is especially important with these unstandardized flours. Not only did our cup weights differ markedly from those reported in 1918 (4), but samples of rice flour from different mills in Los Angeles varied in weight per cup and in liquid absorbed per gram. Among the causes of variation are differences in grain samples, in fineness of milling and between whole grain and bolted flours.

The smallest representative fraction of a type recipe was used as a basic formula.

[1] For the barley, rice, rye, and the lima and soy bean flours we are indebted to The Grist Mill, 524 West Eighth St., Los Angeles; buckwheat flour was purchased in the open market.

Basic muffin recipe (five muffins)

INGREDIENTS	WEIGHT	APPROXIMATE MEASURE
	grams	
Flour	108	1 cup
Baking powder	6	1½ tsp.
Sugar	13	1 tbsp.
Salt		¼ tsp.
Egg	24	½ medium sized
Milk	122	½ cup
Fat (melted)	20	1½ tbsp.

Basic sponge cake recipe

INGREDIENTS	WEIGHT	APPROXIMATE MEASURE
	grams	
Sugar (fine granulated)	65	⅓ cup (scant)
Flour	32	¼ cup
Eggs	103	2 medium large
Lemon juice	6	1 tsp. (generous)
Salt		½ tsp.

Muffins were judged by a committee of four persons, sponge cakes by seven persons. Scores reported are group averages (1, 3). As an objective measure of lightness the volume per gram of the cakes and a few muffins was determined. Cake volumes were calculated from measured surface dimensions, those of muffins determined by displacement of flaxseed (3).

RESULTS AND CONCLUSIONS

MUFFINS

After practice with the basic recipe using wheat flour, experimental muffins were prepared with and without eggs, in which there was substituted an equal weight of barley, buckwheat, rice, rye, lima or soy bean flour. No mixed flours were used although they are sometimes more satisfactory than either flour alone. All muffins were baked five minutes at 300°F., then fifteen minutes at 425°. The scores, summarized from more detailed sub-headings, are given in table 1.

Both with and without eggs the rice, barley, and rye muffins were superior to the others. With eggs, the barley flour gave a satisfactory batter, the rye was too stiff, rice a little too stiff, and the buckwheat much too thin. Omission of eggs caused all the batters to be stiffer and the cooked products less light and more moist. With eggs the barley was

the lightest muffin, followed in order by rice, rye, lima bean, buckwheat and soy bean; without eggs the order was barley, lima bean, rice, buckwheat, with rye and soy bean equal. Representative of the change in lightness are the following volumes per gram: buckwheat with eggs, 2.3 ml. per gram, without eggs, 1.8 ml.; rye with eggs, 2.0 ml., without eggs, 1.8 ml. With the stronger flavored flours, buckwheat and bean, omission of eggs improved the flavor distinctly but buckwheat was still too unattractive in color and flavor for use alone, although it might be satisfactory in a mixture.

Only the barley muffins seemed to be sufficiently cooked. Those from bean were brittle and crumbly, with strong uncooked flavor; the ones from rice and rye were soggy at the center. With eggless muffins bak-

TABLE 1

Summarized scores of muffins made with and without eggs

(Flours substituted by weight in an otherwise unchanged recipe for wheat muffins. Baked at 300°F. for 5 minutes, then at 425° for 15 minutes.)

	GENERAL APPEARANCE		FLAVOR		CRUMB QUALITY		TOTAL SCORE	
	With eggs	No eggs	With eggs	No eggs	With eggs	No eggs	With eggs	No eggs
Maximum score	20.0	20.0	35.0	35.0	45.0	45.0	100	100
Flours used:								
Barley	18.2	14.0	32.6	28.4	40.4	36.4	91	79
Rice	18.9	16.9	32.4	31.5	36.2	37.6	88	86
Rye	16.4	13.4	31.0	30.8	36.4	35.7	84	80
Lima bean	16.3	16.5	18.0	20.3	35.9	35.7	70	73
Soy bean	13.7	16.7	17.5	20.5	31.4	34.5	63	72
Buckwheat	16.7	14.0	18.0	19.5	34.6	33.3	69	67

ings at various temperatures were tried. With the bean flours a lower temperature and longer time gave a markedly better flavor and tenacity, while a higher temperature (450°F.) caused the soy bean muffin to become tough and produced too dark a crust with both kinds. The temperatures and times giving best results with eggless muffins were as follows: barley, 300° for five minutes then 425° for fifteen minutes; rye, 300° for five minutes, 425° for twenty minutes; rice, 425° for twenty minutes; bean, 400° for twenty-five minutes.

Since variations due to milling and other factors may necessitate adjustments of liquid proportions for each new batch of flour, it was deemed impossible to establish a valid optimum for liquid, and so tests were made of liquid variations with only the two most satisfactory flours—barley

and rice. For barley muffins without eggs the basic recipe proved best, but rice was improved by increasing the liquid to 142 gms. These eggless rice muffins baked at 425° for twenty minutes were scored 92 on a scale of 100 and were pronounced the equal of wheat muffins with eggs.

SPONGE CAKES

Sponge cakes made from the various flours listed above gave the results summarized in table 2. Rice was most satisfactory, with barley a

TABLE 2

Sponge cakes

(In all cases except "Rice II" the flours are substituted by weight in an otherwise unchanged wheat flour recipe.)

FLOUR USED	PROPERTIES OF CAKE PRODUCED				
	Form and color	Flavor	Crumb	Total score (maximum 100)	Lightness
					vols. per gram
Rice	Very good	Very good	Fine, even	90	4.0
Barley	Good	Good	Fine, even	89	4.4
Wheat (pastry)	Good	Good	Very fine, even	86	4.5
Buckwheat	Too dark	Good	Very fine, even	86	4.0
Lima bean	Color very light	Quite fair	Fine, even	80	3.9
Soy bean	Good	Fair	Too coarse, uneven	77	3.7
Rye	Too dark	Fair	Too heavy, quite even	77	
Rice cake II (see adjusted recipe)	Very good	Very good	Fine, even	97	4.8

close second. Both were scored slightly above wheat. Rye gives somewhat too heavy a cake, and the soy bean had too pronounced a flavor, while with buckwheat its color is again the handicap of an otherwise desirable product.

Standard conditions of baking sponge cake (6) were found satisfactory for all the substitute flours. With rice and barley tests were made in which the sugar, flour, and lemon juice were each successively increased and decreased. The barley cake was not improved by any departure from the standard recipe. With rice a slight decrease in both flour and sugar was found to improve texture and flavor, while an increase of fifty

per cent in lemon juice produced a better flavor but a poorer texture. Products from whole grain rice flour have a flavor which is nutty rather than starchy and this may account for the fact that our cakes seemed not to require the quantity of lemon juice (2 tablespoons per ¾ cup) which has been reported as necessary to counteract the starchy taste of rice flour (4). The proportions found most satisfactory for a large sponge cake are given below. This cake was scored 97. (See Rice II in Table 2.)

Sponge cake, entire grain rice flour

INGREDIENTS	WEIGHT	APPROXIMATE MEASURE
	grams	
Sugar, fine granulated	171	1 cup, scant
Rice flour, sifted	90	¾ cup
Lemon juice	17	1 tbsp., generous
Eggs	310	7 medium sized
Salt		½ tsp.

SUMMARY

Satisfactory muffins containing neither wheat nor eggs may be made from entire grain rice, rye or barley flours used individually. Lima and soy bean muffins are less desirable, and buckwheat is not satisfactory when used alone. All these flours should be freshly milled.

The stronger flavored flours, buckwheat, lima, and soy bean, are improved in flavor by the omission of eggs.

Entire rice, rye, and bean flours require more cooking than does bolted wheat flour. In substituting these flours by weight for bolted wheat flour in muffins it is best to increase the liquid with rice and rye and decrease it with buckwheat.

Equal measures of different samples of flour from the same grain will vary in weight due to differences in milling, and perhaps other causes.

Any of the flours named may be used by weight to replace wheat flour in a standard sponge cake recipe but the rice cake is improved by decreasing slightly the flour and sugar.

Sponge cakes of entire rice and barley flours were scored higher than those made from wheat.

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(2) CHATFIELD, C.: Home baking, Farmers' Bull. 1450, 1925.
(3) CHILD AND PURDY: A method for a graphic record of texture, volume, and contour of cakes, Cereal Chem., 3: 57–60, 1926.

(4) Experimental Kitchen, U. S. Food Administration: Wheatless sponge cakes, J. Home Econ., 10: 185, 1918.
(5) Gray, C. E.: Experiments with wheat substitutes, J. Home Econ., 10: 348, 1918.
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EDITORIAL

Graham Lusk

The untimely death of the friend and sage counsellor of students of nutrition during the last quarter of a century, Graham Lusk, is noted with profound regret. Dr. Lusk joins the company of the great and devoted disciples of true science, who have gone on before. Student of Carl Von Voit, he was our link with the beginning of the modern era in the science of nutrition, opened by Lavoisier in 1780. The genius of Lavoisier, followed by Liebig and Voit, passed on to the latter's students, among whom were Rubner and Lusk. It was an inestimable privilege to have known Dr. Lusk—his passing leaves a vacant place difficult to fill.

New Concepts Regarding the Concentrated Milks

Advances in nutritional knowledge bring with them many new ideas with regard to standard food products. The various forms of concentrated milk, looked upon with suspicion only a few years ago, are now rather widely and successfully used as substitutes for the customary bottled milk, according to Dr. James A. Tobey. The 1899 edition of Holt's text on pediatrics devoted but one short paragraph to the subject of evaporated milk. The 1929 edition contained pages instead of a mere paragraph on this subject. Marriott,[1] a prominent advocate of the use of evaporated milk in infant feeding, has written extensively on the subject. A recent publication of the White House Conference, *Milk Production and Control*,[2] applies over fifty pages to the subject of concentrated milks, including an extensive list of references. The successful use of evaporated milk for children, in place of bottled milk, has been interestingly discussed by Hollinger and Roberts.[3]

Many clinical and laboratory studies have shown that these concentrated milks, especially with regard to the evaporated form, not only have no nutritional disadvantages, but that they also possess demonstrable qualities of cleanliness and safety, greater digestibility, uniformity, stability, high nutritive value, convenience, and economy. It is the last point that needs especial emphasis at the present time. Administrative

[1] Marriott, W. McK.: Infant Nutrition, St. Louis: The C. V. Mosby Company, 1930. Idem: Simplicity of infant feeding, J. Am. Dietet. A., 4: 1–8, June, 1928.

[2] The Century Company, New York, N. Y., 1932, $3.00.

[3] Hollinger, M., and Roberts, L. J.: Overcoming food dislikes: A study with evaporated milk, J. Home Econ., Dec. 1929.

dietitians and dietitians engaged in out-patient and social service work with individuals and families should keep constantly in mind that evaporated milk, in many localities, may be purchased for less than one-half the cost of the "fresh" or bottled variety.

Milk is milk, whether it comes in forty-quart cans, in glass bottles, in cardboard boxes, or in small tin containers; nutritionally they are the same for all practical purposes. Evaporated milk is, properly, a regular and not a reserve milk supply. It is an effective source of the daily quart ("the surest means of providing an adequate intake of calcium well balanced with desirable amounts of phosphorus, of protein, and of the vitamins"[4]) that should be included in the dietary regimen of every growing child, and of the pint that is the desirable minimum of all health-seeking adults.

The Fifteenth Annual Convention

It has been twelve years since the Association met in New York City, the third annual meeting having been held there in 1920. Of all the states, New York has the greatest number of members of the national association while the Greater New York Dietetic Association has a larger membership than any other local organization. This centralization of membership, combined with the city's many points of professional interest and its attractiveness in the matter of entertainment should insure a greater attendance than at any previous meeting. The list of speakers includes the names of Sherman, Mendel, Rose, and others who have contributed so much to the science of nutrition.

The program and list of exhibitors appear on page 288 of this issue. Reduced fare is in effect on all railroads, a fifty per cent reduction being offered provided members obtain certificates when purchasing tickets and that these certificates are properly endorsed and validated. A registration fee of one dollar will be in effect this year.

[4] Sherman, H. C.: Chemistry of Food and Nutrition, New York: The Macmillan Company, 1932.

CURRENT COMMENT

Frozen Foods

Valuable research in the frozen food field is being conducted by the Agricultural Experiment Stations in a number of widely scattered states, according to a preliminary survey made by the Frozen Foods Association of America. In addition to the work which has been going on for a number of years at the United States Government Station maintained in Seattle, the Agricultural Station at the University of Florida has been engaged in studying the freezing qualities of a number of fruits which are rarely seen in their fresh form in other sections of the United States. Papayas, guavas, sand pears, avocados, youngberries, and other sub-tropical fruits have been frozen experimentally. The Florida Station has a well equipped freezing plant and in addition to the work just mentioned, has been carrying on research in the freezing of orange juice, strawberries, and other products.

At Amherst, Massachusetts, the Experiment Station at the State College has been experimenting with frozen cranberries in addition to a number of other fruits. As a result of this work a number of producers of cranberries in the Cape Cod section are now freezing part of their yield and several thousand barrels of cranberries are frozen each fall. They are held under refrigeration and used for making cranberry sauce during the off season. The Massachusetts Station also has frozen raspberries, peaches, blackberries, strawberries, cherries, plums, nectarines, rhubarb, dates and pineapples. In the work with the strawberries, 30 different varieties have been tested.

Cider has been frozen successfully at the Agricultural Station of the University of Minnesota. This Station has also done considerable work with rhubarb, the frozen rhubarb being used for pies. Raspberries, especially the Latham raspberries, strawberries, plums, peas, and corn, also have been frozen experimentally. The New York State Agricultural Experiment Station has been doing a great deal of freezing, some of it independently, but much in coöperation with Birdseye Packing Company. Director Hedrick reports that the chief object "is to ascertain what varieties of fruits and vegetables are most suitable for freezing."

One of the products which has proved difficult to freeze successfully is corn. The Agricultural Experiment Station at the State College, Fargo, North Dakota, has undertaken a program of experimentation in the freezing of sweet corn, and although nothing yet has been published,

has completed some interesting tests which indicate considerable commercial possibilities. The other stations which have conducted freezing research have, like North Dakota, confined themselves to the freezing of products grown locally.

The determination of what fruits and vegetables are best suited for preservation by freezing is the aim of most of the experimentation now being carried on. The fact that a frozen product is in such a shape that it can be shipped without any of the attendant dangers which are inherent in shipping fresh products, makes it possible to consider the freezing of many of the more delicate and highly flavored varieties, both of fruits and vegetables, which hitherto have been grown only in small quantities because of the impossibility of shipping them long distance.

Emulsion Oil Dressing without Eggs

A very satisfactory mayonnaise substitute may be made by using a paste of fine soy bean flour instead of eggs, according to Ada M. Field, Beulah H. Alexander and Ethel B. Sylvanus of the Laboratory of Home Economics, University of California at Los Angeles. The paste is made by mixing one part of finely ground, sifted soy bean flour with five parts water and boiling for two minutes over direct heat and for fifteen minutes longer in a covered double boiler.

For the dressing the following proportions are satisfactory but others may be used:

¼ cup freshly made, cooled soy bean paste
1¼ to 2 cups salad oil
¼ cup lemon juice or vinegar, plus a little water if needed
1 tsp. each of salt, sugar and ground mustard
¼ tsp. paprika

Place the paste in a bowl and beat with a rotary egg beater while adding the oil in a thin stream. No acid should be added until the emulsion thickens, then small portions used as needed for thinning. The sifted dry ingredients are sprinkled over while giving the final beating.

Hospital Courses for Student Dietitians, Approved by the American Dietetic Association[1]

Hospital	Length of Course	Dietitian	1932 Inspectors	Date of 1932 Inspection
Canada:				
Vancouver General, Vancouver, B. C.	8 mos.	Ethel C. Pipes	Mary Northrop Elizabeth Baldwin	7/32
Univ. of Alberta Hosp., Edmonton, Alberta	9 mos.	Margaret Malone	Elizabeth Baldwin	7/32
California:				
Scripps Metabolic Clinic, La Jolla, San Diego	9 mos.	Helen B. Anderson	Angeline Phillips Helen B. Thompson	7/32
Stanford Univ. Hosp., San Francisco	8 mos.	Charlotte Sloan	Angeline Phillips Florence Armstrong Emily Timlow	7/32
Cottage Hospital, Santa Barbara	9 mos.	Wilda Nylen	Angeline Phillips Helen B. Thompson	7/32
Alameda County Hosp. Highland Hospital Fairmont Hospital, Oakland	8 mos.	Mattie E. Stover Leone Hampton	Angeline Phillips Florence Armstrong Emily Timlow	7/32
Connecticut:				
Waterbury Hospital, Waterbury	8 mos.	Elizabeth Bryant	Mary deG. Bryan Emma Feeney	5/32
Georgia:				
Emory Univ. Hosp., Atlanta	1 yr.	Jessie Harriss	Martha Koehne	6/32
Illinois:				
Cook County Hospital, Chicago	8 mos.	Millie E. Kalsem	Mary deG. Bryan Evelyn Smith	2/32
Michael Reese Hosp., Chicago	1 yr.	Katherine M. Thoma	Mary deG. Bryan Evelyn Smith Phyllis D. Rowe	2/32
St. Luke's Hospital, Chicago	8 mos.	Frances B. Floore	Mary deG. Bryan M. Faith McAuley Louise Gilbert	2/32

[1] The list comprises all those hospitals giving approved course which have been inspected up to August 15, 1932.

		Louise Gilbert		2/32

[1] The list comprises all those hospitals giving approved course which have been inspected up to August 15, 1932.

Wesley Memorial Hosp., Chicago	8 mos.	Elizabeth Tuft	Mary deG. Bryan M. Faith McAuley Alberta Childs Louise Gilbert	 2/32
Indiana:				
Indiana Univ. Hospital, Indianapolis	1 yr.	Lute Troutt	Martha Koehne Marjorie Copher Ruth C. Baumhoff Mary Beeman	 4/32
City Hospital, Indianapolis	9 mos.	Amy Colescott	Martha Koehne Marjorie Copher Ruth C. Baumhoff Mary Beeman	 4/32
Methodist Hospitals, Indianapolis	9 mos.	Margaret Marlowe	Martha Koehne Marjorie Copher Ruth C. Baumhoff Mary Beeman	 4/32
Iowa:				
University Hospital, Iowa City	1 yr.	Kate Daum	Martha Koehne Fern Gleiser	 2/32
Maryland:				
Johns Hopkins Hospital, Baltimore	1 yr.	Phyllis D. Rowe	Mary deG. Bryan Marie Mount Mary Diefenderfer	 5/32
Massachusetts:				
Beth Israel Hospital, Boston	8 mos.	Maniza Moore	Mary deG. Bryan Quindara O. Dodge Helen Clarke	 6/32
Boston City Hospital, Boston	8 mos.	Margaret McGovern	Mary deG. Bryan Helen Clarke Quindara O. Dodge Rosina Vance	 6/32

HOSPITAL	LENGTH OF COURSE	DIETITIAN	1932 INSPECTORS	DATE OF 1932 INSPECTION
Massachusetts:—Concluded				
Children's Hospital, Boston	8 mos.	Martha Stuart	Mary deG. Bryan	
			Helen Clarke	
			Quindara O. Dodge	
			Rosina Vance	6/32
Massachusetts General, Boston	8 mos.	Marion Floyd	Mary deG. Bryan	
			Helen Clarke	
			Quindara O. Dodge	
			Rosina Vance	6/32
Peter Bent Brigham, Boston	8 mos.	Gertrude McDonald	Mary deG. Bryan	
			Helen Clarke	
			Quindara O. Dodge	6/32
Michigan:				
Harper Hospital, Detroit	8 mos.	Mary M. Harrington	Martha Koehne	
			Genevieve Cartmill	
			Bess Whittaker	6/32
Henry Ford Hospital, Detroit	8 mos.	Ruth Smithyman	Martha Koehne	
			Genevieve Cartmill	6/32
			Bess Whitaker	
University Hospital, Ann Arbor	1 yr.	Dorothy S. Waller	Martha Koehne	
			Alta Atkinson	
			Margaret Mills	6/32
Minnesota:				
Ancker Hospital, St. Paul	8 mos.	Winifred H. Erickson	Kate Daum	
			Ruth C. Baumhoff	
			Alice Biester	
			Frances Dunning	5/32
Minneapolis General, Minneapolis	8 mos.	Ethel Gough	Kate Daum	
			Ruth C. Baumhoff	
			Alice Biester	
			Frances Dunning	5/32
Swedish Hospital, Minneapolis	8 mos.	Ethyl Clemens	Ruth C. Baumhoff	
			Alice Biester	
			Frances Dunning	5/32
University Hospital, Minneapolis	8 mos.	Gertrude Thomas	Kate Daum	
			Ruth C. Baumhoff	

University Hospital, Minneapolis	**8 mos.**	**Gertrude Thomas**	**Kate Daum** **Ruth C. Baumhoff** **Alice Biester** **Frances Dunning**	**5/32**
St. Mary's Hospital, Rochester	8 mos. 1 yr. optional	Sr. Mary Victor	Ruth C. Baumhoff	5/32
Missouri:				
Barnes Hospital, St. Louis	8 mos.	Edith Tilton	Mary Harrington	8/32
Research Hospital, Kansas City	8 mos.	Ethel Ollis	Ruth C. Baumhoff Bertha Bisbey	6/32
Nebraska:				
Lincoln General, Lincoln	8 mos.	Leta Linch	Angeline Phillips Margaret Fedde	6/32
New York:				
Albany Hospital, Albany	8 mos.	Virginia H. Ray	Mary deG. Bryan Lenna Cooper	5/32
Buffalo City Hospital, Buffalo	8 mos.	Ursula Senn	Mary deG. Bryan Nelda Ross	1/32
Fifth Avenue Hospital, New York City	8 mos.	Mabel Supplee	Mary deG. Bryan Helen Clarke	6/32
Montefiore Hospital, New York City	8 mos.	Lenna Cooper	Mary deG. Bryan Helen Clarke	6/32
Mt. Sinai Hospital,* New York City	1 yr. min.	Adeline Wood	Mary deG. Bryan Emma Feeney	6/32
Presbyterian Hospital, New York City	1 yr.	Nelda Ross	Mary deG. Bryan Helen Clarke	5/32
Rochester General, Rochester	6 mos.	Effie Winger	Mary deG. Bryan Nelda Ross	1/32
Strong Memorial, Rochester	6 mos.	Grace Carden	Mary deG. Bryan Nelda Ross	1/32
Grasslands Hospital, Valhalla	1 yr.	Rhoda Tyler	Mary deG. Bryan Helen Clarke Emma Feeney	4/32
St. John's Hospital, Brooklyn	8 mos.	Eloise McCreery	Mary deG. Bryan Emma Feeney	6/32

* Graduates of accredited courses who are especially interested in administration are given preference in appointments.

HOSPITAL	LENGTH OF COURSE	DIETITIAN	1932 INSPECTORS	DATE OF 1932 INSPECTION
North Carolina:				
Watts Hospital, Durham	9 mos.	Margaret Fitzhugh	Phyllis D. Rowe	
			Mary deG. Bryan	
			Blanche Shaffer	
			Kathleen Lewis	5/32
Duke University Hosp., Durham	1 yr.	Elsie Wilson Martin	Phyllis D. Rowe	
			Mary deG. Bryan	
			Kathleen Lewis	5/32
			Blanche Shaffer	
Ohio:				
Cincinnati General, Cincinnati	8 mos.	Gertrude Lauche	Martha Koehne	
			Ruth Senteff	6/32
Mt. Sinai Hospital, Cleveland	8 mos.	Helen Mallory	Martha Koehne	
			Ethel Thompson	
			Florence Bateson	5/32
Starling-Loving, Columbus	8 mos.	Mary Louise Bone	Martha Koehne	
			Alice Hoover	
			June Kennedy	4/32
Miami Valley Hospital, Dayton	1 yr.	Alta B. Hirsch	Martha Koehne	
			Ruth Senteff	6/32
Oklahoma:				
University Hospital, Oklahoma City	8 mos.	Margery Ardrey	Kate Daum	7/32
Oregon:				
Portland Dietitian Training Course	8 mos.		Jessamine Williams	
Multnomah County Hospital		Edna B. Carl	Melissa Hunter	
Good Samaritan Hospital		Elizabeth Stewart	Elizabeth Baldwin	6/32
Doernbecher Hospital		Dorothy J. Keane		
Pennsylvania:				
Pennsylvania Hospital,† Philadelphia	1 yr.	Helen E. Gilson	Mary deG. Bryan	
			Laura Drummond	
			Grace Godfrey	
			Emma Feeney	4/32

† Post-graduate course in Food Clinic also offered.

† Post-graduate course in Food Clinic also offered.

Philadelphia General,† Philadelphia	8 mos.	Elizabeth Miller	Mary deG. Bryan Marjorie Bacheller Grace Godfrey Emma Feeney	4/32
Homeopathic Hospital, Pittsburgh	8 mos.	Irene Willson	Mary deG. Bryan Rena Eckman Pauline Sanders	2/32
Western Pennsylvania, Pittsburgh	8 mos.	Charlotte Addison	Mary deG. Bryan Rena Eckman Pauline Sanders	2/32
Tennessee:				
Vanderbilt Univ. Hosp., Nashville	8 mos.	Salome Winckler	Martha Koehne Georgia Newsom	6/32
Utah:				
Latter Day Saints, Salt Lake City	8 mos.	Katherine Bielby	Kate Daum	7/32
Virginia:				
Medical College of Va., Richmond	9 mos.	Aileen Brown	Phyllis D. Rowe Mary deG. Bryan Kathleen Lewis	5/32
Washington:				
Washington State Interne Training Course, Seattle	9 mos.		Effie Raitt Jennie Rowntree	6/32
Seattle General Hospital		Evelyn Engdahl		
Swedish Hospital		Ruth Forsberg		
Virginia-Mason Hospital		Louise Powley		
Harborview Hospital	9 mos.	Mary Northrop	Effie Rait Jennie Rowntree	7/32
Washington, D. C.				
Walter Reed General Hosp., Washington, D. C.	1 yr.	Grace H. Hunter	Mary deG. Bryan Frances Kirkpatrick Lurena Perrine	5/32

BOOK REVIEWS

Chemistry of Food and Nutrition, 4th ed. By Henry C. Sherman, Ph.D., Sc.D., Mitchell Professor of Chemistry, Columbia University. New York: The Macmillan Company, 1932, pp. 614. $3.00.

This standard text, published first in 1911, has consistently kept pace in its several editions with the rapid advances in the knowledge of the chemistry of food and nutrition during the past twenty years. Nearly all of the text in this fourth edition has been completely rewritten. Chapters on the acid-base balance, and iron and copper in nutrition, and more extensive treatment of the vitamin subject are outstanding modifications. Many new data are also included in the table of mineral content and vitamin values of foods. The lists of references have been compiled with such completeness, yet brevity, that the reader is in touch with the significant literature most directly concerned with the text.

The format of the book is especially pleasing, the type kind to the eyes, the familiar green binding now red. The dimensions of the volume have been slightly increased, while the number of pages has remained practically the same as in the previous edition, thus retaining its compact size. Dietitians will welcome this comprehensive yet succinct edition of an indispensible text and reference.

M. P. H.

Economics of Food Consumption. By Edith Hawley, Formerly Senior Food Economist in the Bur. of Home Econ., United States Department of Agriculture. New York: McGraw-Hill Book Company, Inc., 1932, $3.00.

Economics of Food Consumption is a recent publication of the McGraw-Hill Euthenic Series. It is like Chemistry and Cooking (reviewed in the JOURNAL, June, 1931) in that it is a text book with a new view point for the home economics student. The author states, however, that courses in nutrition and principles of economics are prerequisite to the course in food economics as presented. She recognizes the increased attention being given to the relation of the home in its many aspects to society, rather than the individual problems.

The book "analyzes food habits in the United States and foreign countries, evaluates the various diets in common use to determine whether they meet the nutritional needs of the people, examines the trends in industry, both those that are contributory to the consumer's welfare and those that are opposed, discusses governmental attitude toward consumer problems and, finally, the consumer's place of power in the economic world and how she may use it with intelligence and discretion." The author significantly refers to the consumer as "she" in this relation and feels that it is her particular province to right many of the existing wrongs; the power for accomplishing this will come through cooperation.

All of the material in the book is valuable and interesting, but we especially liked the chapters on Changing Food Habits, Economic Trends in Food Manufacture, and Consumer's Responsibility. The chapter on Cost of American Diet is pertinent despite the fact that much of the data is not recent, necessarily. Part III is devoted to the accepted methods for collecting and analyzing foods.

L. G. G.

The School Dormitory. By Carrie A. Lyford. Boston: M. Barrows & Co., 1932, pp. 200.

This small book dealing with administrative and educational problems is a useful addition to the literature in this field. It contains much valuable material in compact form.

An historical sketch introduces the reader to a discussion of the importance of dormitory supervision. Suggestions are given for enlisting the students in a participation of management responsibilities. A typical organization for a dormitory staff is concisely presented.

Among the more important chapters are those dealing with the planning, furnishing and care of the dormitory.

The discussion of the food department is quite complete, yet briefly stated. It includes a plan of equipment lay-out and information on marketing and storage of food, student diet, dining room equipment and management and plans for the use of student labor. Tables showing average amounts of foods required per student and for 100 students per meal will be useful for reference.

Suggestive discussions of the dormitory as a training school and the dormitory as a home, complete the book.

The list of references given at the end of each chapter are of value to any one concerned with the variety of problems covered by this material.

Health Through Projects. By G. D. Brock. New York: A. S. Barnes & Co., 1931. pp. 268. $2.00.

This book will prove suggestive to all who are teaching health, whether in school, or clinic, or to the lay group. Its twenty-three topics are well selected and their manner of presentation particularly helpful to the busy person. Various types of foods are discussed. There is no topic devoted to an adequate diet. It would have strengthened the treatment of food if such had been included with suggestive menus.

Each topic is developed in the same way. First, there is given "a general treatise of the subject from the teacher's point of view." Next, briefly stated, are the aims, objectives, habits, and attitudes sought.

The third section can best be described in the author's own words. It "is the center of interest in this work. Various projects are suggested which have within them the spirit of play. These projects offer the opportunity for proper health habit practice for the pupils at home, at school, and elsewhere."

References are listed including both books and periodicals "of the type which treat the subjects from the health education point of view." It is to be regretted that in making this list the latest editions, in some instances, were not used.

One of the most helpful suggestions in the book is a description of Health Score Charts and how to use them. All groups would find these stimulating.

LAURA COMSTOCK.

Food Preparation Studies. By Alice M. Child, Kathyrn B. Niles and Agnes Kolshorn. New York: John Wiley and Sons, Inc., 1932, pp. 156, $1.75.

This volume is the result of the teaching experience of the authors with undergraduate and graduate students. An organized plan of presentation has been developed which should provoke independent thinking and reasoning on the part of the student. The plan is a departure from the usual method of teaching food preparation; facts and principles are given, but the definite applications are to be filled in by the student. A knowledge of some science should be a prerequisite to the course as outlined. The authors have aimed to give a thorough understanding of a limited field of cookery, rather than a superficial knowledge covering a broader laboratory practice. Score cards for judging products, approximate basic proportions and substitutions, temperature regulations, unit measures of food, and a helpful list of references are included. The volume should prove helpful not only with college classes but with nurses or in organizing work with elementary food classes.

Food and Your Body: Talks with Children. By Mary Pfaffmann and Frances Stern. Boston: M. Barrows and Company, 1932. pp. 170, $2.00.

Here is a distinct contribution to the teaching of nutrition—a book that will be of immediate and continued value to the grade teacher as well as to the teacher trained in nutrition or home economics, and to parents, in fact to every worker for child health.

In a fascinating manner it presents fundamental principles. We find in it a series of discussions, as of teacher with child, in which the elements of the science of nutrition are developed, with experiment, story, game,

motion picture and handwork to show their application to life. Unforgettable are the chapters on "Calcium, the Builder," "Growing," "Food Iron," "Foods for the Body Engine," and the clever presentation of the vitamins under the guise of "A Mystery Story." It is a book of many happy ideas, yet based on sound science, painstakingly verified in the light of present knowledge.

Preceding each discussion is a summary for the teacher, and a list of materials for visualization. References at the end of each chapter state the sources of these materials. The ingenious charts are most helpful and can be reproduced by the child.

While the book was written for use with children of the intermediate grade level, it could be adapted for use with children both younger and older. It should prove especially serviceable to the teacher who is training teachers. Indeed, it will aid in adult education, for its style makes it easily adaptable to the understanding and needs of child and adult.

Nutritive Value of Foods. By Dorothy S. Waller. Ann Arbor, Michigan: George Wahr, 1932, pp. 17, $.50.

This useful table of food values, originally published in 1928, has been revised and may now be obtained in a more convenient octavo size.

A Key to the White House Conference. The Conference Office, Interior Building, Washington, D. C.

The publications of the White House Conference on Child Health and Protection, when complete, will represent the most comprehensive library of childhood which has yet been assembled. More than half of the total forty volumes are now off the press. Each new book appearing sets in motion again the ever-widening circle ot interest in the Conference findings.

The reports in the volumes now available are serving as guides for workers in many specialized fields of child welfare. The above volume, however, tells the whole story of the Conference briefly and in a very readable fashion, and is finding its way onto book shelves in private homes as well as into the reference libraries of leaders of civic and social groups. It contains the significant leading speeches of the Conference, including those of President Hoover and Ray Lyman Wilbur, M.D., the Chairman, together with abstracts of the reports of all the Conference Committees, and the Committees' recommendations. As a large edition of the book was published, it has been possible to make an attractive board edition available at fifty cents, including postage. There is also a cloth edition at $2.00. The book may be obtained through the Conference office, Interior Building, Washington, D. C.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal Diseases of Children

Vol. 44, June, 1932

*Antirachitic value of milk from cows fed irradiated yeast. E. T. Wyman and A. M. Butler.—p. 1509.

*Study of the water and mineral balances in epileptic children. I. McQuarrie, R. C. Manchester and C. Husted.—p. 1519.

The respiratory metabolism in infancy and in childhood. The effect of thyroid therapy on the metabolism of protein in normal infants. L. E. Weymuller, T. C. Wyatt and S. Z. Levine.—p. 1544.

Vol. 44, July, 1932

Numbers and types of organisms found in certain products used in infant feeding. H. E. Matoon.—p. 16.

Acid-base balance of new born infants: consideration of the low alkaline reserve of normal new born infants. E. Marples and V. W. Lippard.—p. 31.

Basal metabolism of twenty-one Chinese children reared or born and reared in the United States. C. C. Wang and J. E. Hawks.—p. 69.

ANTIRACHITIC VALUE OF MILK FROM COWS FED IRRADIATED YEAST. Four active cases of rickets, two in infants and two in children, were fed milk from cows that received irradiated yeast. In every instance there was a definite healing of the rickets with a rise in the calcium—phosphorus product and a deposition of bone. The milk still possessed antirachitic properties after five minutes' boiling. It was decided that calcium and phosphorus must be present in amounts of about thirty milligrams per one hundred cc. of blood serum, to permit the deposition of calcium phosphate in the tissues.

THE STUDY OF THE WATER AND MINERAL BALANCE IN EPILEPTIC CHILDREN. A study of the effects of diuresis, catharsis, phenobarbital therapy, and water storage was made. The leakage of potassium shows weakness in the retaining membrane of the central nervous system. Abnormal amounts of water and sodium found entry to the cells at the same time. The given data favors the view that the inherent defect in the mechanism for regulating permeability of the brain cell membrane is characteristic. The specific action of the phenobarbital would maintain the normal relationship of the electrolysis and water on the two sides of the cell membrane.

American Journal of Public Health

Vol. 22, July, 1932

*Food poisoning due to toxic substances formed by strains of the cloacae-aerogenes group. R. Gilbert, M. B. Coleman and A. B. Laviano.—p. 721.

FOOD POISONING DUE TO TOXIC SUBSTANCES FORMED BY STRAINS OF THE CLOACAE-AEROGENES GROUP. Bacterial species including B. cloacae, B. protens, and staphylococci, are being found to incite gastro-enteritis following consumption of food containing these microörganisms or the toxins which they produce. An outbreak resulting from cream-filled pastry was traced to toxic substances produced by organisms of the cloacae-aerogenes group. The pastry had been made from good materials, using clean utensils and in a room scrupulously clean. By eliminating all other factors, it was concluded that the bacteria had been introduced by the "cracked" eggs used. Highest standards of cleanliness cannot prevent contamination from dust, egg shells and utensils which harbor bacteria; but the production of toxic substances can be averted by continuous refrigeration during the brief period before distribution to the consumer.

American Restaurant Magazine

Vol. 15, July, 1932

Pepping up those jadded appetites. C. A. Patterson.—p. 21.

I like these summer salads. H. Ewing.—p. 26.

Consider the pineapple. P. H. Beuter.—p. 32.

Some salmon dishes that make the appetite say yes. M. H. Martin.—p. 34.

Vol. 15, August, 1932

Corn dishes for August menus. H. Ewing.—p. 24.

*Fast cooking vs. shrinkage.—p. 30.

When noise ruins the digestion. H. C. Nulmoor.—p. 34.

Here are some new desserts. M. J. Peterson.—p. 50.

FAST COOKING VERSUS SHRINKAGE. An experiment was conducted at a convention of the Ohio State Restaurant Association by R. O. Roth and L. M. Stone, both of the Ohio State University. Two fifteen-pound choice beef ribs were roasted in an electric oven, one at a temperature of 230°F., the other at 500°F., during the whole roasting process. Calculations were made for cookery losses, palatability, flavor, juiciness and tenderness. The rib roasted at 230°F. was found to be much superior to the one cooked at the high temperature. Both ribs weighed exactly 15 pounds and 8 ounces before cooking. After cooking, the one done at the low temperature weighed thirteen pounds while the other only nine pounds. Percentage yield for the slow rib was 83.8 per cent, for the fast rib 60.4 per cent. The audience voted the slow rib as the best for flavor, color, tenderness and palatability. It was brought forward that a four year study at the Missouri Station indicated seared meats shrink more than unseared meats. Those cooked at a low temperature make more servings and have a nicer texture and are more tender.

Hospital Management

Vol. 34, July, 1932

*Efficient ward food service. E. M. Shrader.—p. 41.
*Efficient private room food service. B. Curry.—p. 42.
Efficient food service from engineering viewpoint. G. E. Quick.—p. 44.
These things show dietitians value. A. Brown.—p. 45.

EFFICIENT WARD SERVICE. Economical food service can be accomplished only by careful planning on the part of an intelligent and coöperative dietary staff taking into consideration several important problems. One of the primary factors is the making of menus, adequate and pleasing to the patients' needs, yet coinciding with the daily market. True central service is too expensive to be practical, but with the use of insulated trucks it is possible to send both hot and cold foods to the wards in a compact manner. Student nurses should be trained as to the method of setting up an attractive ward tray economically, so that they may take charge of food service on the ward, as well as taking care of the special diets. Special diets should be kept as low in number as possible because of their expense. By weighing the garbage which is returned from the ward each day a good check on food economy is kept. Coöperation between the dietary staff and all divisions of the hospital helps to maintain an efficient and economical food service.

EFFICIENT PRIVATE SERVICE. The dietitian of today is trained technically and practically so as to assure an efficient kitchen staff and serve food that is up to standard. A well organized and properly staffed dietary department is of primary importance. Each worker is held responsible for his particular duty giving a personal aspect which is valuable in any type of work. It is important that good wholesome food be prepared and served in the most inviting and pleasing manner. When planning the menus avoid repetition and give enough choice to make the menu satisfactory to all.

Patients are made up of people of all nationalities and classes, and each nationality has been accustomed to certain foods. When the food of their particular country is served to them they are most pleased. It is up to the dietitian to plan diets not too unlike those to which the patients are accustomed.

Central service is found to be an ideal method of food service in many hospitals. The preparation of the meals and trays for general diets and formulas is concentrated in the main kitchen, thus avoiding much unnecessary handling, dishing and reheating of food. Electrically heated trucks are used to convey the food; the top shelf is not heated and conveys the cold food.

Hospital Topics

Vol. 10, May, 1932

*What the A. M. A. committee on foods is doing for hospitals. R. Hertwig.—p. 14.
Needed: A good chef. A. W. King.—p. 36.
Variety and economy with inexpensive desserts. A. E. Boller.—p. 50.

Vol. 10, June, 1932

Special diets and reduced incomes. A. E. Boller.—p. 48.

Vol. 10, July, 1932

Variety and hot weather salad menus. A. E. Boller—p. 42.

Vol. 10, August, 1932

*Economical marketing. F. G. Sanderson.—p. 17.
Modern syllabubs and summer beverages. A. E. Boller.—p. 50.

WHAT THE A. M. A. COMMITTEE ON FOODS IS DOING FOR HOSPITALS. The committee on foods of the American Medical Association has undertaken a service in the interest of the public and physicians that is also of value to the hospital dietitian. The committee is passing on foods submitted and accepting those fulfilling its requirement for nutritional values and for truthful and proper advertising. Foods bearing the seals of the committee and their promotional claims may be taken at face value.

ECONOMICAL MARKETING. Economical marketing can be promoted by demanding standardized and well-labeled products. In purchasing fruits and vegetables, examination of the crate or hamper in which they are shipped should help in determining their grade. Packers should use labels which give the following information: the amount of the pack stated in pints or grams; the grade of the pack; the number of the can; the date when packed; the serial number of the guarantee which vouches for the information; the number of portions, the name of the packing company and the place packed; the name and address of the distributor; distinguishing colors of labels for each class of goods; and suggested uses of the product.

Hotel Monthly

Vol. 40, July, 1932

Tripe, food for the anemic. A. Fries.—p. 28.
*Beef, always in season. A. Shircliffe.—p. 51.

Vol. 40, June, 1932

*Cheese in its many forms. A. Shircliffe.—p. 52.

BEEF, ALWAYS IN SEASON. An excellent and complete study of the grades of beef is given including details of conformation, finish and quality under each class of beef carcass, that is, steer, heifer, cow, stag and bull.

CHEESE IN ITS MANY FORMS. A dictionary of cheese which includes type, character and uses, with notes on production and history is given.

Journal American Medical Association

Vol. 98, June 11, 1932

*Clinical features of vitamin A deficiency. G. B. Eusterman and D. L. Wilbur.—p. 2054.

Vol. 98, June 18, 1932

Edema as influenced by a low ratio of sodium to potassium intake. M. H. Barker.—p. 2193.
*Review of recent studies on the antineuritic vitamin; its chemical and physiologic properties and the effects of its deprivation on the animal body. H. D. Kruse and E. V. McCollum.—p. 2201.

Vol. 98, June 25, 1932

Asthma from food odors. S. M. Feinberg and P. L. Aries.—p. 2280.
Vitamin B, in relation to the clinic. G. R. Cowgill.—p. 2282.
The early stages of vitamin A deficiency. Editorial.—p. 2290.

Vol. 99, July 2, 1932

*Diabetic coma with blood sugars about one thousand milligrams: report of three cases with recovery following treatment. C. J. Haines and R. Davis.—p. 24.
The present status of vitamin B_2 (G): historical survey. B. Sure.—p. 26.

Vol. 99, July 9, 1932

Pellagra. G. A. Wheeler and W. H. Sebrell.—p. 95.
The changing diet of the American people. L. B. Mendel.—p. 117.
*Clinical aspects of vitamin G deficiency. F. P. Underhill.—p. 120.

Vol. 99, July 16, 1932

The diet in Bright's disease. J. S. McLester.—p. 192.
*Vitamin D. R. C. Clouse.—p. 215.

Vol. 99, July 23, 1932

Progress in the nutrition of infants. J. I. Durand.—p. 275.
*Vitamin D. R. C. Clouse.—p. 301.

Vol. 99, July 30, 1932

The clinical significance of vitamin D in infancy and childhood. F. W. Schlutz.—p. 384.

Vol. 99, August 6, 1932

Celiac disease: its specific treatment and cure without nutritional relapse. S. V. Haas.—p. 448.
Vitamin E. H. M. Evans.—p. 469.

Vol. 99, August 13, 1932

*The treatment of pernicious anemia with digested liver. C. W. Barnett and W. M. Thebaut.—p. 556.
Teeth and the diet. Editorial.—p. 564.

CLINICAL FEATURES OF VITAMIN A DEFICIENCY. States of vitamin A deficiency are observed less frequently in adults than in infants and young children. Vitamin A deficiency diseases may result from reduction of adequate intake of vitamin A, from deficient absorption and storage as the result of intestinal or hepatic derangement or disease, or from an increased demand for, and consumption of the vitamin, as in rapid growth or severe infectious diseases.

Vitamin A deficiency manifests itself clinically and pathologically by affecting epithelial tissues in a specific way. There is a substitution of stratified keratinizing epithelium for normal epithelium in various parts of the respiratory, alimentary and genito-urinary tracts, in the eyes and in the paraocular organs.

Effects on eye result in two types of changes: (1) hemeralopia and (2) xerophthalmia.

Vitamin A deficiency results in high susceptibility to infection of the respiratory organs. Diarrhea is frequent in both children and adults suffering from vitamin A deficiency. Vitamin A deficiency affects the central nervous system. Patients are apathetic and mentally numb. Children are indolent in first stages, and later extremely irritable.

REVIEW OF RECENT STUDIES ON THE ANTINEURITIC VITAMIN: ITS CHEMICAL AND PHYSIOLOGIC PROPERTIES, AND THE EFFECTS OF ITS DEPRIVATION ON THE ANIMAL BODY. The vast accumulation of facts concerning the distribution, properties and physical behavior of vitamin B recorded when it was held to be a unit substance has had to be re-examined in the light of its dual nature. The normal physiology of the antineuritic factor has been learned by study of impaired function or abnormal conditions arising from varying degrees of B avitaminosis. Anorexia, the effect on absorption and assimilation in the intestinal tract, inanition, possible relationship of vitamin A and B, and oxidation are discussed. Studies pro and con of the anatomic changes due to vitamin B deficiency by the various workers is given. All concentrates and even crystals of the antineuritic vitamin thus far prepared have been contaminated by the presence of other components of vitamin B complex.

DIABETIC COMA WITH BLOOD SUGAR ABOVE ONE THOUSAND MILLIGRAMS. Diabetic coma with a blood sugar above one thousand milligrams has been treated successfully with sodium bicarbonate and insulin given through a gastro-duodenal tube, which was left in place during the treatment. In the three cases reported there was complete recovery.

CLINICAL ASPECTS OF VITAMIN G DEFICIENCY. Although the prevalent opinion is that vitamin G deficiency is intimately associated with the symptoms included under the term pellagra, there is a reluctance, which seems to be justified, in accepting the view that a single food deficiency may be responsible for such a varied series of clinical manifestations. Some writers have even suggested that what is called pellagra may be a mixture of diseases rather than an entity.

Points of view have also been presented which included infection carried by winged insects of blood sucking habits. Though this may be true, diet plays the predominant rôle in the production or prevention of pellagra.

Dietary restriction instituted to combat some other disease may in itself give rise to symptoms characteristic of pellagra. An illustration is the treatment of epilepsy by the administration of a ketogenic diet.

VITAMIN D. Vitamin D has not been prepared in a state pure enough to permit the determination of its chemical and physical properties. Irradiation of ergosterol with ultraviolet rays leads to a number of important chemical and physical changes. There is a marked transformation in the absorption spectrum. The "absorption spectrum" is as characteristic of each individual compound as any other of its physical properties and may therefore be used as a means of identification. At present there is not sufficient experimental evidence to warrant the establishment of a separate toxic factor, distinct from vitamin D. It

is now known that the two fat-soluble vitamins, A and D, associated very closely in cod liver oil, are not parallel. Consequently, some oil relatively rich in A is poor in D, and vice versa. Hess has demonstrated experimentally the antirachitic potency of egg yolk. It is possible to increase the antirachitic potency of the egg ten to twenty times by irradiation of the hens, and to promote a five-fold increase by cod liver oil feeding. The vegetable margarines exhibit a lack of antirachitic potency while the animal margarines contain an appreciable amount. Steenbock reports that the antirachitic potency developed in foods by irradiation seems to be a stable property. According to Harris and Innes, vitamin D functions to facilitate the absorption of calcium and phosphorous from the intestine and, secondly, to maintain the level of calcium and phosphorus in the blood.

VITAMIN D. A summation of the present knowledge of vitamin D is briefly presented in this article concerning the anti-rachitic factor: a history of its discovery and separation from vitamin A; the action of ultra violet rays in its formation form ergosterol; its influence in improving mineral metabolism; its storage in the body; various methods for its quantitative determination; standards now used and those advocated for testing the potency of the end product; the relation of wave lengths of light to its formation; its solvents; the effect of over-irradiation; and rays and treatments other than ultra-violet effective in its formation.

THE TREATMENT OF PERNICIOUS ANEMIA WITH DIGESTED LIVER. In late experiments carried on in treating pernicious anemia beef has been found to compare with liver after digestion in gastric juice. Walden and Clowes increased the potency of liver by mixing it with stomach tissue. Reimann used digested liver, obtaining the gastric juice from histamine stimulation and reached results with as little as ten grams daily. However, this last experiment has not been proved, showing that liver digested with gastric juice is no more effective in the cure of anemia than raw liver and raw liver extract. The potency gained in these cases may have been caused by the substance being present in the liver and the stomach tissue or formed during digestion.

Journal Biological Chemistry

Vol. 97, July, 1932

*On the fatty acids essential in nutrition. G. O. Burr, M. M. Burr and E. S. Miller.—p. 1.

The effect of insulin on the phosphorus compounds of muscle. S. E. Kerr and M. E. Blish.—p. 11.

Production of vitamin A by a species of Corynebacterium. C. E. Skinner and M. F. Gunderson.—p. 53.

*Irradiated milk: the amount of energy required to prevent rickets in chickens. G. C. Supplee, R. C. Bender and M. J. Dorcas.—p. 63.

Studies in vitamin A avitaminosis in the chick. C. A. Elvehjem and V. F. New.—p. 71.

Carotene and xanthophyll as sources of vitamin A for the growing chick. O. L. Kline, M. O. Schultze and E. B. Hart.—p. 83.

The chemistry of the coffee bean oil. R. O. Bengis and R. J. Henderson.—p. 99.

Phosphorous distribution in chicken blood as affected by the diet. V. G. Heller, K. R. Hunter and R. B. Thompson.—p. 127.

*Avitaminosis. The specific effect of vitamin B on growth as evidenced by the use of vitamin B concentrates. B. Sure.—p. 133.

The basal metabolic rates of vegetarians. G. Wakeham and L. O. Hansen.—p. 155.

*Iron retention by women during pregnancy. C. M. Coons.—p. 215.

The reaction of the chicken to irradiated ergosterol and irradiated yeast as contrasted with the natural vitamin D of fish liver oils. H. Steenbock, S. W. F. Kletzien and J. G. Halpin.—p. 249.

Vitamin D and the conservation of calcium in the adult. S. W. F. Kletzien, V. M. Templin, H. Steenbock and B. H. Thomas.—p. 265.

*Isolation and identification of vitamin C. W. A. Waugh and C. G. King.—p. 325.

Vol. 97, August, 1932

A study of the milk, blood, and excreta of cows fed moderate and excessive amounts of irradiated yeast or ergosterol. A. F. Hess, R. F. Light, C. N. Frey and J. Gross.—p. 369.

Studies in gastric secretion. Variations in the chlorine content of gastric juice and their significance. F. Hollander.—p. 585.

ON THE FATTY ACIDS ESSENTIAL IN NUTRITION. It has been found that a deficiency disease results from the lack of certain fatty acids in the diet. Through experimentation it was determined which fats were essential. The saturated fatty acids found in hydrogenated cocoanut oil are of no fat

value; oleic acid is of this class. Pure methyl linolate is effective and all oils which contain appreciable amounts of this acid are likewise good. Both linolenic and linoleic acic are effective. They appear to be about equal in value and can replace each other in the tissues. Esters of these acids have no value.

IRRADIATED MILK: THE AMOUNT OF ENERGY REQUIRED TO PREVENT RICKETS IN CHICKEN. Recent tests have been made to determine the antirachitic properties of different samples of dry milk activated with a known kind and amount of energy. The amount of milk consumed per day by white Leghorns was calculated to the original fluid milk basis. The milk that received 1328 x 10^3 milligrams or more per cubic centimeter from various carbon arcs and mercury vapor arcs contained sufficient vitamin D to afford complete protection against rickets. By the degree of protection against rickets afforded to growing chickens the antirachitic properties of irradiated milk can be accurately determined.

AVITAMINOSIS. Two ways in which vitamin B produces growth are: it stimulates the appetite, thus causing an increase in food consumption; and it produces a specific influence on growth, which though unrelated to the plane of nutrition, is essential for growth in the sense that certain amino acids and certain mineral salts are necessary for growth.

As little as one to two milligrams of vitamin concentrates, as a source of the vitamin B complex, produced a specific influence on growth.

IRON RETENTION BY WOMEN DURING PREGNANCY. The article reports iron balance studies made on twenty-three women at different stages of pregnancy. The results indicate the ability of the maternal organism to assimilate enough iron from food, during pregnancy, to supply the newborn infant with the needed reserves. In all but one case positive balances were recorded, with a possible tendency toward high iron storage early in pregnancy and lower during the last months. The iron retention seems to be affected by individual variations as influenced by the quantity of iron intake, the physiological demands of the mother's body and the factor of digestion.

ISOLATION AND IDENTIFICATION OF VITAMIN C. A crystalline antiscorbutic substance has been obtained by precipitation with a half saturated solution of lead acetate in absolute alcohol. The observed chemical and physical properties indicate that the active factor is identical with the hexuronic acid reported by Szent-Györgyi and Kendall as a reactant in plant and animal oxidation-reduction systems. One-half mg. of this substance, daily, is the protective level and corresponds with 0.5 mg. of hexuronic acid estimated by Szent-Györgyi (1928) in 2 cc. of orange juice. The active factor and hexuronic acid correspond in: (a) optical rotation; (b) acid titration equivalent (except for the free acid); (c) carbon and hydrogen combustion; (d) reversible formation of a lactone and a free acid; (e) typical crystal forms; (f) precipitation as a lead salt; (g) and instability toward alkalies and oxidizing agents.

Journal Home Economics

Vol. 24, July, 1932

Cooking tests with lima bean flours. A. M. Field and E. Kaufman.—p. 626.

Vol. 24, August, 1932

Truth in food advertising. M. S. Chaney.—p. 705.
*The effect of fat on shrinkage and speed in the roasting of beef. M. Thille, L. J. Williamson and A. F. Morgan.—p. 720.

THE EFFECT OF FAT ON SHRINKAGE AND SPEED IN THE ROASTING OF BEEF. Using a temperature of 210°C. as the most desirable for the roasting of beef, the authors have concluded that, due to the change in the heat conductivity of fat as it passes from the solid to the liquid state, the speed of heat penetration is increased by exterior fat, but may be decreased by interior fat. Fat roasts shrink less than lean roasts. The shrinkage is greatest in the width, is less in the length.

Journal of Nutrition

Vol. 5, July, 1932

*The addition of raw beef or meat scrap to a wheat-milk diet. W. C. Russell.—p. 347.
The effect of rachitogenic diets on the thyroid gland of the albino rat. J. Thompson.—p. 359.
*Saline and alkaline drinking waters. V. G. Heller.—p. 421.
The influence of diet on renal and blood vessel changes. F. Bischoff.—p. 431.

THE ADDITION OF RAW BEEF OR MEAT SCRAP TO A WHEAT MILK DIET. Addition of fresh beef or meat scrap to a wheat-milk diet, used as a breeding colony ration for white rats, improved reproduction, growth rate and general vigor of the young as compared to the performance on the wheat-milk diet.

Dried yeast used with the wheat-milk diet caused a slight improvement in reproduction, but not in growth and general vigor.

The improved performance on the wheat-milk diet supplemented with fresh beef or with meat scrap cannot be due chiefly to an increase in calcium and phosphorus or to an increase in the calcium phosphorus ratio.

SALINE AND ALKALINE DRINKING WATERS. Waters having more than 1.5 to 1.7 per cent of soluble salts are harmful to animals for drinking purposes. There is an interference in reproduction and lactation, and as the salt increases in concentration stunted growth and death may result due to the osmotic change rather than to any specific ion. However, chlorides are less harmful than sulfates, organic salts less than inorganic, and normal salts less than alkalies.

Modern Hospital

Vol. 38, June, 1932

Tempting the capricious appetites of sick children. E. E. Janson and G. Stephenson.—p. 49.
Dietitians and dietitians and compensations for all. B. M. Joseph.—p. 122.

Vol. 39, July, 1932

The dietitian—her past, present and future. C. J. Decker.—p. 73.
*Recent progress in nutrition and how it affects the dietitian. S. L. Smith.—p. 124.

RECENT PROGRESS IN NUTRITION AND HOW IT AFFECTS THE DIETITIAN. Nutrition studies during pregnancy in regard to nitrogen, calcium and phosphorus balances show disturbed mineral retention of the mother.

As breast feeding progresses milk becomes richer in fat, protein, casein-nitrogen, total solids and nitrogen, but all breast milk is low in vitamin G.

Present data indicates that supermineralization takes place in an infant on a food higher in concentration of salt than that intended by nature.

Experiments by Witt indicate that the absolute retentions of calcium and phosphorus were greater on cows' milk than on breast milk, but the percentage utilization was higher on breast milk.

Practical Home Economics

Vol. 10, July, 1932

*Nutritional value of dried fruit. I. J. Todd.—p. 227

Vol. 10, August, 1932

The ups and downs of eating. E. Braunigan.—p. 247.

NUTRITIONAL VALUES OF DRIED FRUITS. Dried fruits are quick and abundant sources of energy. Minerals are found in dried fruits, especially iron, copper and phosphorus in raisins, prunes, peaches, apricots and apples. Prunes have been found to contain the same amount of vitamin A as spinach. Dried fruits react alkaline and thus are of value in alkaline ash diets.

NEWS NOTES

PROGRAM OF THE FIFTEENTH ANNUAL CONVENTION, AMERICAN DIETETIC ASSOCIATION

HOTEL PENNSYLVANIA, NEW YORK CITY, NOVEMBER 6–10, 1932

Sunday, November 6

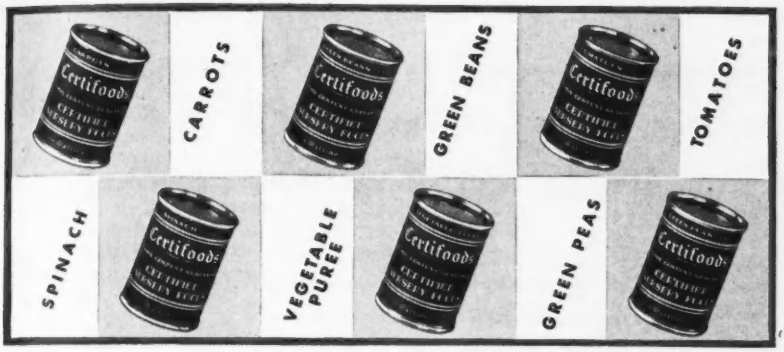
10:00 a.m. Executive Committee Meeting
4:30 p.m. Tea in the Lounge Room
Guests of the Hotel Pennsylvania

Monday, November 7

8:30 a.m. Registration
9:00 a.m. Visit exhibits
11:00 a.m. General Session, Dr. Martha Koehne, President, presiding
"Recent Advances in Nutrition,"—Dr. Henry C. Sherman, Columbia University, New York
1:00 p.m. Welcoming Luncheon
2:30 p.m. Annual Business Meeting, Dr. Martha Koehne, President, presiding
3:30 p.m. Visit exhibits
7:00 p.m. Annual Banquet, Dr. Martha Koehne, President, presiding
Address, Dr. Lafayette B. Mendel
Address, Dr. Mary Swartz Rose

Tuesday, November 8

8:00 a.m. Visit exhibits
10:00 a.m. Joint session of Social Service and Education Sections, Laura Comstock and Dr. Mary deGarmo Bryan, presiding
Reports on Section activities
12:30 p.m. Flavor Luncheon—Program by New York City Home Economics Association, Edith Barber, President, presiding
Address, Mr. J. L. Sweeney, Hotel Statler
Address, May Van Arsdale, Teachers College
2:00 p.m. General Session, Mary Lindsley, presiding
"Special Problems in the Administration of the Institution Food Unit," Cora C. Colburn, Director of Dining Halls, Yale University
Ten minute talks on Food Topics
Helen Stacey, Special Assistant, American Telephone and Telegraph Company
Harriet Stone, Supervisor of Nutrition, Newark Public Schools, Newark, N. J.
Adeline Wood, Chief Dietitian, Mt. Sinai Hospital, New York, "Buying Meat; Study of Cuts"
Emma Halloway, Supervisor of Institutional Courses, Pratt Institute, Brooklyn, N. Y., "The School Cafeteria as a Unit in Teaching Institutional Courses"
S. A. Larrison, Refrigerating Engineer, "Refrigeration"
3:30 p.m. Visit exhibits
4:30 p.m. Surprise entertainment, American Woman's Association, Guests of Greater New York Dietetic Association
7:00 p.m. Foreign Dinner, Theatre and Broadway on Election Night



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Wednesday, November 9

9:00 a.m. Visit exhibits

10:00 a.m. General Session, Dr. Kate Daum, presiding
"Feeding the Family in an Emergency," Lucy Gillette, A.I.C.P., New York City
"Taking Institutionalism out of the Institution," Dr. Alfred F. Hess, New York City
"Problems of Feeding and Rationing Federal Prisoners," Dr. Paul H. Howe, United States Department of Agriculture

12:30 p.m. Exhibitors Luncheon, Mary Barber, presiding
One minute talks by exhibitors

2:00 p.m. Joint Session of Diet Therapy and Administration Sections, Mrs. Dorothy Stewart Waller and Faith McAuley, presiding
Reports on Section activities

4:00 p.m. Trip to Columbia University Nutrition Laboritories
Tea at Pratt Institute, Brooklyn

7:00 p.m. Dinner for heads of departments giving approved training courses. Open also to representatives of college home economics departments: Dr. Mary deGarmo Bryan, presiding

Evening: Trips to Waldorf-Astoria Hotel, an ocean liner, Chinatown, or to the National Broadcasting Station

Thursday, November 10

9:00 a.m. Visit exhibits

10:00 a.m. General Session, S. Margaret Gillam, presiding
"Food and the Mind," Dr. Earl Bond, Philadelphia
"Food Sensitiveness and Intolerance," Dr. Maximilian A. Ramirez, New York City
"The Rôle of Diet in Tropical Medicine," Dr. T. T. Mackie, New York City

1:00 p.m. Affiliation Luncheon, open only to delegates Dr. Martha Koehne, presiding

2:00 p.m. General Session—Mrs. Mary P. Huddleson, presiding
"Anemia Studies," Dr. Frieda S. Robscheit-Robbins, University of Rochester Medical School, Rochester, New York
"Anemias: Clinical Study," Dr. Randolph West, Presbyterian Hospital, New York City
"Present Status of the Ketogenic Diet and Its Use," Dr. Clifford Barborka, Chicago, Ill.

4:00 p.m. Trip to Good Housekeeping Institute
Air Trips

7:00 p.m. Foreign Dinners
Theatre
Midnight market trip

Friday, November 11

Trips to hospitals:
Columbia Medical Center, Cornell Medical Center, Mt. Sinai, Fifth Avenue or Bloomingdale
Air trips, or trips to Empire State Building, Walker-Gordon Dairy Farm, or museums

Exhibitors, Convention, November 6–10, 1932

Battle Creek Food Company, Battle Creek, Mich.
Borden Company, New York, N. Y.
Bureau of Coffee Information, New York, N. Y.
Chicago Dietetic Suply Company, Chicago, Ill.
R. B. Davis Company, Hoboken, N. J.
Erie Equipment Company, Erie, Pa.
Evaporated Milk Association, Chicago, Ill.
J. B. Ford Company, Wyandotte, Mich.
General Baking Company, New York, N. Y.

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2 proteins of exceptionally good quality
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2 some protein — inferior to proteins in either the bran or embryo

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1 abundant in energy producing oils
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4 a considerable quantity of the anti-infection vitamin A
5 proteins of high nutritional value, comparable to the proteins of milk and eggs

PLUS* — *an extra added quantity of Wheat Embryo rich in Vitamin B which is now added to Ralston Wheat Cereal to supply the deficiency of this appetite-stimulating vitamin which is the cause of much anorexia, retarded development, nervousness and irritability among growing children. (Rice, C. V., M. D. — Arch. Ped. Sept. 1930, page 572.)

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International Nickel Company, New York, N. Y.
Kellogg Company, Battle Creek, Mich.
Charles B. Knox Company, Johnstown, N. Y.
Kraft-Phoenix Cheese Corporation, Chicago, Ill.
J. B. Lippincott Company, Philadelphia, Pa.
Lister Brothers, New York, N. Y.
The Macmillan Company, New York, N. Y.
Mead Johnson Company, Evansville, Ind.
Mellin's Food Company, Boston, Mass.
Nutradiet Company, Brooklyn, N. Y.
E. L. Patch Company, Boston, Mass.
Ralston Purina Company, St. Louis, Mo.
Rex Cole, Inc., New York, N. Y.
W. B. Saunders Company, Philadelphia, Pa.
Savory, Inc., Newark, N. J.
John Sexton & Company, Chicago, Ill.
Emma Smedley, Media, Pa.
E. R. Squibb & Sons, New York, N. Y.
Standard Brands, Inc., New York, N. Y.
S. M. A. Corporation, Cleveland, Ohio
Swartzbaugh Mfg. Company, Toledo, Ohio
The Walk-Over Company, New York, N. Y.
The Wander Company, Chicago, Ill.

The American Red Cross, through its Vice-Chairman, James L. Fieser, announces that the services of Melva B. Bakkie—former assistant to Miss Schuman and prior to that to Dr. Eichelberger in the Midwestern Office, and for some years a qualified and authorized Nutrition Instructor in The Red Cross Chapter at St. Joseph, Mo.—have been retained as Red Cross Nutrition Consultant. Miss Bakkie will act as Nutrition Consultant and as the person in charge of the dietitians' enrollment. The dietitians' enrollment maintained by the American Red Cross for the Army and Navy is in fulfillment of its functions to the military forces in time of war. Its continuance is particularly pleasing to General Robert U. Patterson, Surgeon General, U. S. Army.

The Food and Nutrition classes, conducted by authorized volunteer instructors, are to be continued and promoted, with supervision, guidance and authorization by the nutrition consultant.

The enrollment of dietitians is continued to serve as a reserve corps for the Army and Navy in time of war or disaster, and as volunteer food and nutrition instructors in Chapters in time of peace.

Where nutrition personnel is employed by Chapters, or jointly with other local organizations, Chapters may refer their nutrition problems to the nutrition consultant for advice and secure such nutrition material as is available for distribution. Chapters, interested in adding a nutritionist to their staff where a real need for such exists and where the necessary budget can be assured, will be advised and assisted by the nutrition consultant in securing a well qualified worker.

Chapters engaged in emergency food relief measures, school lunch activities, conducting camps, institutes, etc., and having problems growing out of the local community work of their Public Health Nurse, may refer nutrition problems involved in these activities to the consultant for help and suggestions. Other phases of the work of the nutrition consultant will be developed in accordance with the demand and need for such services.

The American Home Economics Association announces that Dr. Lemo T. Dennis has been appointed field worker in child development and parental education and will begin her new duties on September 1. She succeeds Dr. Esther McGinnis, who returns to her regular work as associate professor at the Institute of Child Welfare, University of Minnesota.

Dr. Dennis comes from Rochester, New York, where she has been working with the Rochester Society for the Prevention of Cruelty to Children, directing its Observation Home for Problem Children and giving help to parents in their homes and through group instruction. A graduate of the University of Nebraska, her advanced study has been carried on at the Merrill-Palmer School, Columbia University, and Cornell University, where after a year's study as a fellow under the Spelman Fund she was granted the

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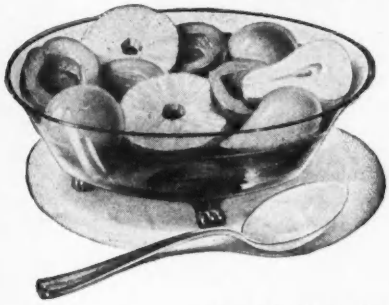

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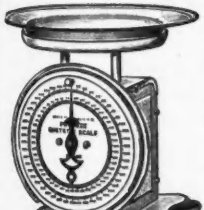
First: It is a revolving dial type. The outside circle of figures gives the weight of each portion. The inner circle of figures gives the total weight of the prescription when the last portion is weighed; thus assuring the operator that no mistake has been made and the total is correct.

Second: It expedites the weighing of food. The scale includes a porcelain enameled plate, sufficiently large for all purposes. This plate is much lighter in weight than an ordinary china plate. In using different china plates you are required each time to adjust the scale at zero, which causes unnecessary delay. The plate provided is a part of the scale and the index hand remains at zero with the plate on the scale, thus much time and labor are saved in the operation of weighing. Capacity 500 grams by 2 grams.



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degree of doctor of philosophy for work in family relationships done through the departments of rural social organization, child development, and psychology in coöperation. Dr. Dennis seems an especially happy choice at this particular point in the development of the American Home Economics Association's project in child care and parental education. The work was begun under the late Anna E. Richardson, whose unusual administrative ability and acquaintance with educational institutions and workers enabled her to outline the whole program and survey the status and possibilities of home economics in the general field of parent education.

Homemaking Classes. Among the practical answers to the present unemployment situation is the work now being done in the Young Women's Christian Association of Providence, Rhode Island, by Eleanor Wells, Director of the School of Homemaking and a well-known member of the American Dietetic Association. According to a letter from Miss Wells, "the majority of the girls have been in office or shop work, and came with an alert eye and a keen mind to apply themselves to this type of work. The hardest to train has been the mill girl; they seem to move in a circle of their own, not seeing anything new to be done. There is little initiative on their part, and they seem quite helpless in the use of their hands. But observation has revealed that it is the stultifying type of work which they have done rather than lack of native intelligence, which has produced this result. Gradually they come out of their shell and develop an ability in this form of technical work quite equal to the others."

Sixty girls and women have been enrolled in the free classes of the Homemaking Department with the end in view of helping them to secure positions. The groups are itemized as—three housemaids classes of eight students each—a course for hotel chambermaids with an enrollment of ten, and one for hotel or tea room waitresses of 24 students. This with a free class in dressmaking of twelve students completes the list. This last class was primarily to help the students get their wardrobes in trim, and many dresses have been brought in to be made over. The waitresses have received actual practice in the cafeteria of the residence, where on Tuesdays and Thursdays the dining room has been converted into a service tea room. Each girl has her station and is responsible for eight to ten guests. The group has also had banquet experience in taking care of the Business Girls and the Health Education Mother and Daughter dinner parties. Eight of this group signed summer contracts for an Adirondack Inn. Seven others have already taken positions.

The Williams & Wilkins Company of Baltimore announces its purchase, on June 16, of the inventory assets of William Wood & Company, medical publishers of New York City. Good will and use of the Wood name and imprint is included in the purchase.

William Wood & Company is one of the oldest medical publishing houses in the country, having been established in 1804 by Samuel Wood. The firm name will be perpetuated under the new arrangement, and the business of William Wood & Company will be conducted from Mt. Royal and Guilford Avenues, Baltimore. The Wood Company is well-known as a publisher of medical text books and importer of English medical books. The Williams & Wilkins Company is a young company which has specialized in research publications of several sorts, including medical works. The list of titles of the combined concerns approximates 600.

The Greater New York Dietetic Association held their final meeting in June at which time Dr. O'Gorman, of "Mothers Institute," Jersey City, N. J., addressed the meeting.

Final reports for the year were read and the announcement of the election of the following officers for the year 1932–1933 were given: President, Dorothy De Hart, Roosevelt Hospital; Vice-President, Mrs. I. Anshutz, Bloomingdale Hospital; Secretary, Alice E. Whitfield, Bank of New York &

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DIETITIANS

By referring to page 300 of this issue of the JOURNAL, you will find reprints listed which will be of material assistance in teaching normal nutrition and diet therapy to student nurses, dietitians, medical students, and the layman. Other reprints listed will assist the administrative dietitian with her problems.

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Trust Co.; Treasurer, Anastasia Shankey, Mount Vernon Hospital.

The Association will assemble the last of September for a "Convention Rally Dinner."

Ohio Dietetic Association. In an attempt to arrive at some conclusion regarding standardized food values, a committee comprised of Bessie Wallace, Mt. Sinai Hospital, Cleveland, and Grace King, Grant Hospital, Columbus, collected and evaluated the various sources of figures now in use in the state. In answer to a questionnaire, nineteen various authorities for food values were given; these were traced to their origin and most were found to be based on the figures in Bulletin 28 of the U. S. Dept. of Agriculture. These original figures had merely been translated to measures or convenient weight groups. Bulletin 220 of the Connecticut Agricultural Experiment Station, and the more recent Government bulletins, Circulars 389 and 50, were used as additional source material in many instances. Tables for minerals, in general use, were all traceable to Sherman with but one exception.

The use of percentage groupings in figuring diabetic diets was very prevalent; fourteen of the sixteen dietitians replying used this method. Of the six who used salt-poor diets, two merely added no salt to food, and did not compute the sodium chloride content.

It would seem from the questionnaire that most of the dietitians in the state are using figures from the same sources, but it is surprising to note the extent of divergence when these original sources are individually interpreted or modified by the use of other source material.

Dietitians Association of Philadelphia. At the April meeting the fifteenth anniversary was celebrated with a Jubilee Dinner at the Touraine Hotel. Elizabeth Miller, the toastmistress, called on Mrs. Fuller who recounted to us the early activities of the Dietitians' Section of the Philadelphia Home Economics Association, which later became the Dietitians Association of Philadelphia. Words of greeting were extended by Miss McCollister of the Alice McCollister Tea Room of New York and by Helen E. Gilson, Chief Dietitian of the Pennsylvania Hospital, as well as letters of greetings from other charter members who were unable to be with us.

Mildred Stevens, President of the Association, presented to Helen E. Gilson a silver vase in appreciation of her untiring efforts in working for the Association and especially in recognition of the manner in which Miss Gilson managed the Annual Friendship Dinner held under the auspices of the Association.

As this was the annual business meeting, the following officers were elected: President, Dorothy MacKenzie, Director of Cafeteria, Strawbridge and Clother; Vice-President, Dixie Rudberg, University of Pennsylvania Hospital; Secretary, Margaret Mason, Philadelphia General Hospital, Treasurer, Mamie Kirk, Philadelphia School Lunch. The following are the chairmen of the Standing Committees: Program, Grace Godfrey, Drexel Institute; Membership, May Fay, New Century Guild; Hospitality, Mildred Stevens, Philadelphia Federal Reserve Bank; Publicity, Jean Richmond, Drexel Institute.

At the June Meeting the annual spring outing was held at the Old York Road Country Club. Dorothy MacKenzie, the incoming President, presented Marjorie E. Bacheller with a silver cup to convey the appreciation of the Association to Miss Bacheller for her many years of excellent service as Treasurer.

The members of the Association are looking forward to the meetings of the coming year with a great deal of anticipation since they are assured that the program committee will plan as many pleasant and inspiring ones as that committee did in the season just past.

The Scranton (Pa.) *Dietetic Association* has just finished a very successful year. The officers elected for the coming year are: President, Ann Dimmick; Vice-President, Elease Weinss; Secretary-Treasurer, Marie O'Hora, Hahnemann Hospital, Scranton, Pa.

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WHO'S WHO IN THIS ISSUE

BERNICE WAIT, PH.D., received her doctor's degree at the University of Chicago, June, 1931. The material in her current article was in part her doctor's thesis. She has been a member of the staff of the department of Home Economics at the Oregon Agricultural College, Corvallis, Oregon, and of the University of Washington at Seattle. She is now director of Purnell research in Home Economics, Massachusetts Agricultural College, Amherst, Massachusetts. LYDIA J. ROBERTS, PH.D., is Professor and Chairman of the Department of Home Economics, University of Chicago, author of *Nutrition Work with Children*, and several government bulletins and numerous articles on this and related subjects.

LUCILE STREATER received her B.S. degree from Milwaukee-Downer College, Milwaukee, Wisconsin, and her nutrition interne training at the University of Michigan Hospital, Ann Arbor, Michigan. She is now a member of the staff, in charge of the food service for the Pediatrics Department and is consulting dietitian at the University of Michigan Elementary School.

CLARA MATTHES received her B.S. degree from Southwest Texas State Teachers College, and took her student dietitian training under Mary E. Smith, Memorial Hospital, Houston, Texas. HELEN SEAGO received her B.A. degree from the University of Illinois and took her student dietitian training at Barnes Hospital, St. Louis, Mo. They are dietitian and assistant dietitian, respectively, at John Sealy Hospital, Galveston, Texas.

REGINALD FITZ received the A.B. degree from Harvard University, and the M.D. degree from Harvard Medical School in 1909. He is now Visiting Physician to the Peter Bent Brigham Hospital and Associate Professor to Harvard Medical School.

ELIZABETH HAYWARD is a prominent member of the California State Dietetic Association. She received her student training at Johns Hopkins Hospital and was dietitian at the White Memorial Hospital for three years. Miss Hayward is well known for her work with the California Fruit Growers Association, and while at the Cottage Hospital, Santa Barbara. She is now dietitian at Las Encinas Sanitarium, Pasadena, California. DOROTHY S. WALLER was a contributor to the July *Journal*.

ADA M. FIELD received her Ph.D. degree in chemistry at Columbia University in 1928. She was lecturer in Home Economics at the University of California at Los Angeles 1929 to 1930, and lecturer in Household Science, University of California at Berkeley, 1930 to 1931. Additional data concerning Miss Field may be found in *American Men of Science*. BERNICE GOLD and HELEN LUNDGREN were students at the University of California at Los Angeles at the time this study was made.

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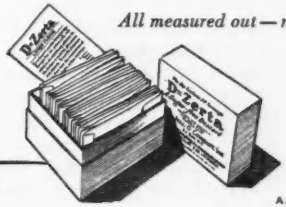

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